Networking your world

NV-600LI/RI

Managed Industrial Grade VDSL2 CO/CPE Router

USER'S MANUAL

Http://www.netsys.com.tw

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Foreword: Industrial-grade VDSL2 Router solution

Attention:

Be sure to read this manual carefully before using this product. Especially Legal Disclaimer, Statement of Conditions and Safty Warnings.

Netsys' NV-600LI/NV-600RI is an industrial of management VDSL2 router that leverages the extraordinary bandwidth promise of VDSL2 (max. 100Mbps symmetric) technology, the next step in the delivery of new high-speed Internet applications in industrial environments. In addition to use **DIN-Rail** design compliant with quick, easy, economical to install and maintain, the NV-600LI works with the NV-600RI over existing copper wire infrastructure. NV-600LI is a CO(Central Office) device while NV-600RI is a CPE (Customer Premise Equipment) device.

Netsys' NV-600LI/RI DIN-Rail and Industrial-grade design offers quick, easy, economical and high-performance broadband/multimedia services to industrial environments such as Factory, MRT, Train station, Ticket vending machine, Parking system, Monitoring system and point to point applications.

Caution:

The NV-600LI/RI is for **indoor** applications only. It can be used in industrial-grade applications. This product does not have waterproof protection, please do not used in outdoor applications.

Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions before using the device.

- **DO NOT** open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel can service the device. Please contact your vendor for further information.
- **Use ONLY** the dedicated power supply for your device. Connect the power to the right supply voltage (110V AC used for North America and 230V AC used for Europe. NV-600LI/RI support 12 to 48 VDC dual power input(Redundant power)).
- **Place** connecting cables carefully so that no one will step on them or stumble over them. DO NOT allow anything to rest on the power cord and do NOT locate the product where anyone can work on the power cord.
- **DO NOT** install nor use your device during a thunderstorm. There may be a remote risk of electric shock from lightning.
- **DO NOT** expose your device to dampness, dust or corrosive liquids.
- **DO NOT** use this product near water, for example, in a wet basement or near a swimming pool.
- **Connect ONLY** suitable accessories to the device.
- **Make sure** to connect the cables to the correct ports.
- **DO NOT** obstruct the device ventilation slots, as insufficient air flow may harm your device.
- **DO NOT** place items on the device.
- **DO NOT** use the device for outdoor applications directly, and make sure all the connections are indoors or have waterproof protection place.
- **Be careful** when unplugging the power, because may produce sparks.
- **Keep** the device and all its parts and accessories out of children's reach.
- **Clean** the device using a soft and dry cloth rather than liquid or atomizers. Power off the equipment before cleaning it.
- This product is **recyclable**. Dispose of it properly.

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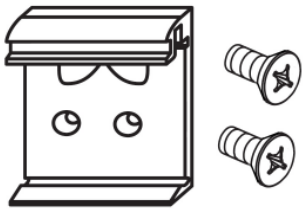
CHAPTER 1. UNPACKING INFORMATION

1.1 Check List

Carefully unpack the package and check its contents against the checklist.

Package Contents:

			
1 x Industrial VDSL2 CO or CPE router	1 x CD User's Manual	Accessory Kit : 1 x DIN-Rail mounting plate, 2 x screws, 4 x Feet, Protective caps (Console*1, RJ-11*1, RJ-45*3), 1 x 6pin Terminal Block, 1 x 2pin Terminal Block	

Notes:

1. Please inform your dealer immediately for any missing or damaged parts. If possible, retain the carton including the original packing materials. Use them to repack the unit in case there is a need to return for repair.
2. Please using protective caps for unused ports.

Chapter 2. Installing the Router

2.1 Hardware Installation

This chapter describes how to install the router and establishes network connections and may install the router on any level surface (e.g. a table or shelf or rail). However, please take note of the following minimum site requirements before one begin.

2.2 Pre-installation Requirements

Before you start the actual hardware installation, make sure you can provide the right operating environment, including power requirements, sufficient physical space, and proximity to other network devices that are to be connected.

Verify the following installation requirements:

- Power requirements: **DC 12 to 48VDC redundant power.**
- The router should be located in a cool dry place, with at least **10cm/4in** of space at the front and back for ventilation.
- Place the router away from direct sunlight, heat sources, or areas with a high amount of electromagnetic interference.
- Check if the network cables and connectors needed for installation are available.
- Do Not install phone lines strapped together with AC power lines, or telephone office line with voice signal.
- Avoid installing this device with radio amplifying station nearby or transformer station nearby.

2.3 General Rules

Before making any connections to the router, please note the following rules:

- **Ethernet Port (RJ-45)**

  All network connections to the router Ethernet port must be made using Category 5 UTP or above for 100Mbps, Category 3, 4 UTP for 10Mbps.

  No more than 100 meters of cabling may be use between the MUX or HUB and an end node.

- **VDSL2 Port (RJ-11)**

  All network connections to the RJ-11port must use **24~26** gauge with **twisted pair** phone wiring.

  We **do not recommend** the use of the telephone line 28 gauge or above.

2.4 Connecting the Router

The router has four Ethernet port which support connection to Ethernet operation. The devices attached to these ports must support auto-negotiation or 10Base-T or 100Base-TX unless they will always operate at half duplex. Use any of the Ethernet ports to connect to devices such as Monitor system, Server, Switch, bridge or router.

Note:

1. The RJ11 Line port is used to connect to telephone that is connected to VDSL CO and CPE router (Point-to-point solution).
2. Unused RJ-45 ports(Ethernet Ports), please use protective cap to avoid dust intrusion.
3. Slave device(CPE) must connect Master device(CO) through the telephone wire. Slave cannot connect to Slave, and Master cannot connect to Master.

2.5 Terminal Block and DIN-Rail mount installation

This section describes how to install the Terminal Block and DIN-Rail to the router, if you do not installation the DIN-Rail, please stick the 4 rubber feet at the bottom to avoid scratches.

- Take out the "2pin / 6pin terminal block" from inside the accessory kit, and install to the router properly. (Figure 2-1)
- Please refer to install the DIN-RAIL as following step:

1. Install the DIN-Rail mounting plate to the NV-600LI/RI. (Figure 2-2)
2. Please use the suitable DIN-Rail to install, please refer to the dimensions of the DIN-Rail.(Figure 2-3)
3. Insert the top of the DIN-Rail into the top slots on the DIN-Rail mounting plate and the DIN-Rail mounting plate will snap into place. (Figure 2-4)

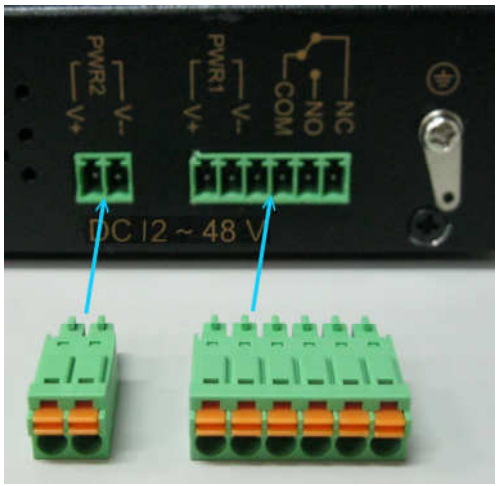


Figure 2-1

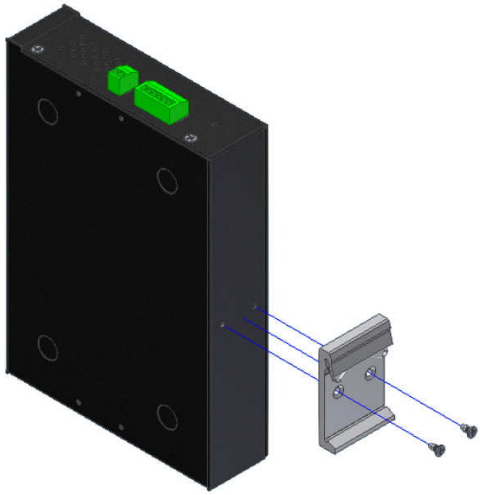


Figure 2-2

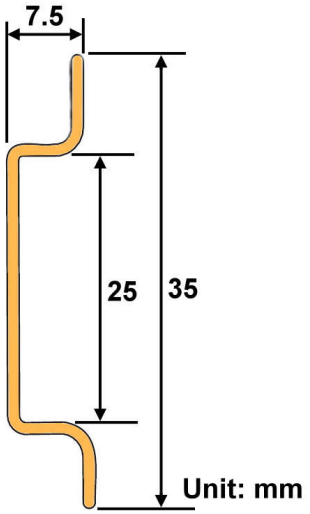


Figure 2-3

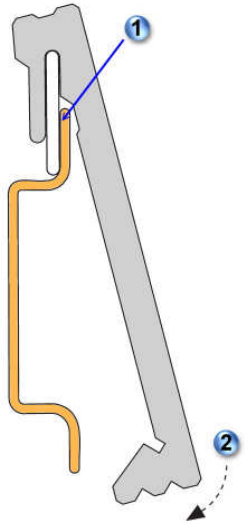


Figure 2-4

2.6 Connecting the RJ-11 / RJ-45 Ports

- The line port has 2 connectors: RJ-11 and terminal block. It is used to connect from NV-600LI(CO) using single pair phone cable to NV-600RI(CPE) bridge side (point to point solution). Take note that NV-600 line port cannot be used at the same time. Either RJ-11 port is connected or terminal block is connected using straight connection (Figure 2.4) or cross-over connection(Figure 2.5)

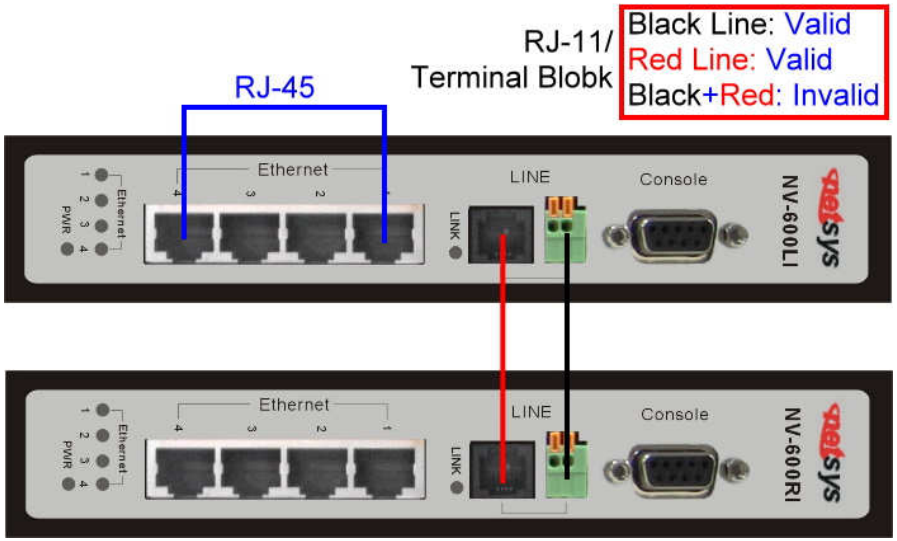


Figure 2.4 NV-600LI/RI line ports straight connection

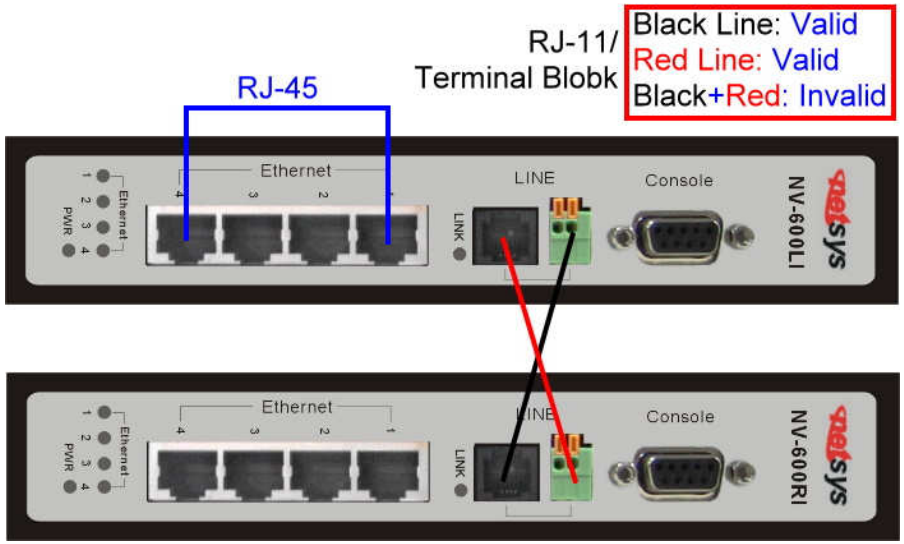


Figure 2.5 NV-600LI/RI line ports crossover connection

- When inserting a RJ-11 plug, make sure the tab on the plug clicks into position to ensure that it is properly seated.
- **Do not** plug a RJ-11 phone jack connector into the Ethernet port (RJ-45 port). This may damage the router. Instead, use only twisted-pair cables with RJ-45 connectors that conform to Ethernet standard.

Notes:

1. Be sure each twisted-pair cable (RJ-45 ethernet cable) does not exceed 100 meters (333 feet).
2. We advise using Category 5~7 UTP/STP cables for Cable bridge or Router connections to avoid any confusion or inconvenience in the future when you attached to high bandwidth devices.
3. RJ-11 (VDSL2 Line port) use **24 ~ 26** gauge with twisted pair phone wiring, we do not recommend 28 gauge or above.
4. Be sure phone wire has been installed before NV-600LI/RI powered on.

2.7 Industrial VDSL2 router Application

The router's line port supports 100Mbps/0.3km for data service across existing phone wiring. It is easy-to-use which do not require installation of additional wiring. Every modular phone jack in the home can become a port on the LAN. Networking devices can be installed on a single telephone wire that can installation within suitable distance (depends on speed) (Figure 2.6)

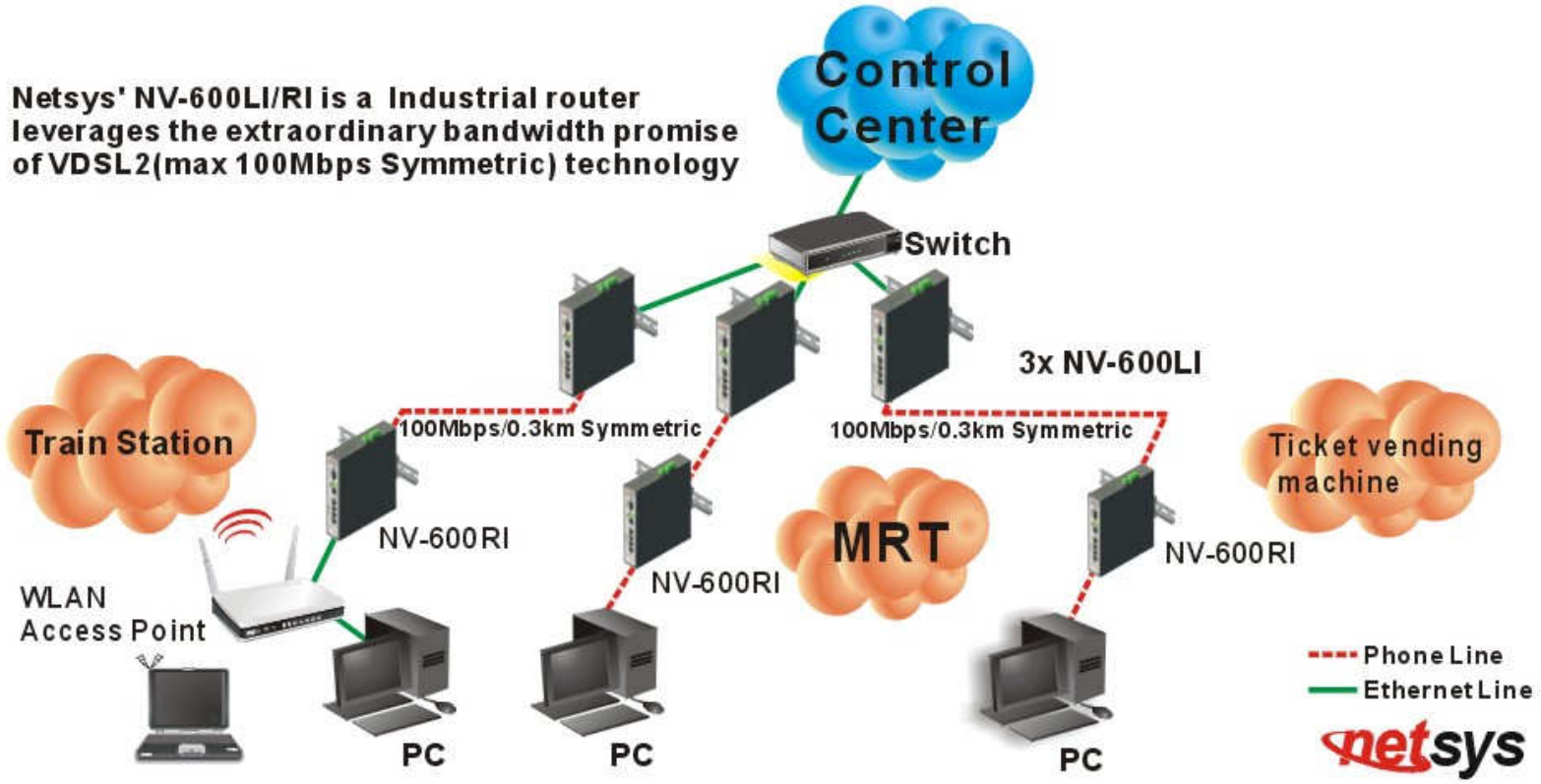


Figure 2.6 NV-600LI/RI application

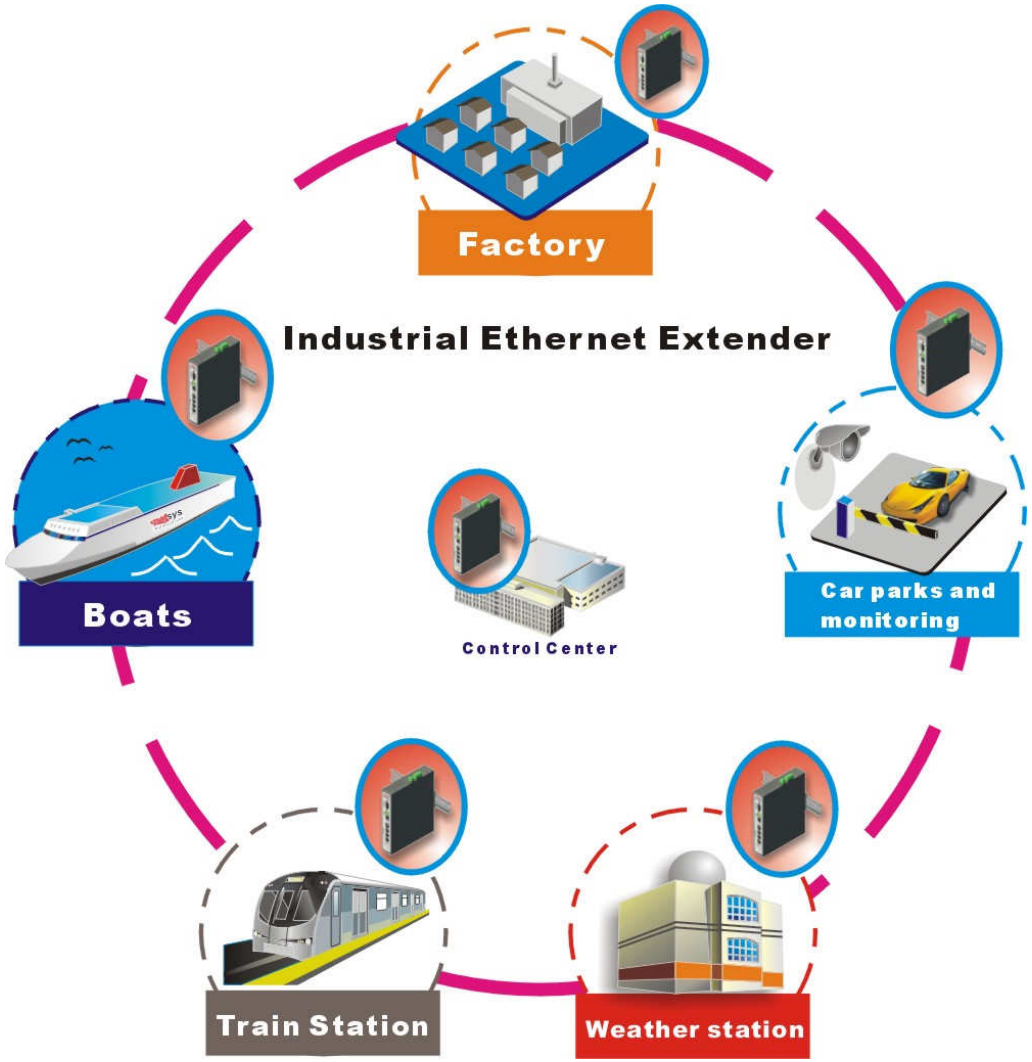


Figure 2.7 NV-600LI/RI industrial-grade application

◆ 2.7.1 Connect the NV-600LI and the NV-600RI to the Line

The objective for VDSL2 is to pass high speed data over a twisted pair cable. In the setup, connects NV-600LI to NV-600RI through phone wire(24~26 AWG) or line simulator or any other hardware representation of a cable network, with or without noise injection and crosstalk simulations.

◆ 2.7.2 Connect the NV-600LI and the NV-600RI to LAN Devices

In the setup, usually an Ethernet tester serves as representation of the LAN side as well as representation of the WAN side.

◆ 2.7.3 Run Demos and Tests

The Ethernet tester may send data downstream as well as upstream. It also receives the data in order to check the integrity of the data transmission. Different data rates can be tested under different line conditions.

Chapter 3. Hardware Description

This section describes the important parts of the router. It features the front panel, side panel and rear panel.

NV-600LI Outward

NV-600RI Outward

3.1 Front Panel

The figure shows the front panel. (Figure 3.1)

Figure 3.1 Front Panel(NV-600LI / NV-600RI)

Tip:

At a quick glance of the front panel, it is easy to determine if it has Ethernet signal from its RJ-45 port and if there is vdsl line signal on RJ-11 port.

And the table shows the description. (Table 3-1)

Table 3-1 Description of the router front connectors

Connectors	Type	Description
Ethernet(1-4)	RJ-45	For connecting to a Ethernet equipped device.
Line	RJ-11/Terminal Block	For connecting to VDSL2 bridge. (**Do not** use RJ11 and Terminal Block at the same time.)
Console	RS-232	For connecting to PC with RS-232 serial port over a D-SUB Cable

3.2 Front Indicators

The router has **Six** LED indicators. The following Table shows the description. (Table 3-3)

Table 3-3 LED Indicators Description and Operation

LED	Color	Status	Descriptions
PWR (Power LED)	Green	On(Steady)	Lights to indicate that the VDSL2 router had power
		Off	The device is not ready or has malfunctioned.
ETHERNET 1-4 (Ethernet LED)	Green	On(Steady)	The device has a good Ethernet connection.
		Blinking	The device is sending or receiving data.
		Off	The LAN is not connected.
LINK (VDSL2 LED)	Green	On(Steady)	The Internet or network connection is up.
		Blinking	The device is sending or receiving data.
		Off	The Internet or network connection is down or has malfunctioned.

Note:

Two Routers connection may take within 3 minutes is normal, due to NV-600LI/RI to establish a link mechanism is auto-negotiation, with detects and calculate CO and CPE both PBO and PSD level as well as noise level ....and other argument etc. for getting a better connection.

3.3 Rear Panel

The following figure shows the rear panel. (Figure 3.3)

Figure 3.3 Rear Panel

Note:

Please refer to section 2.5 to install DIN RAIL.

3.4 Side Panel

The following figure shows the side. (Figure 3.4)

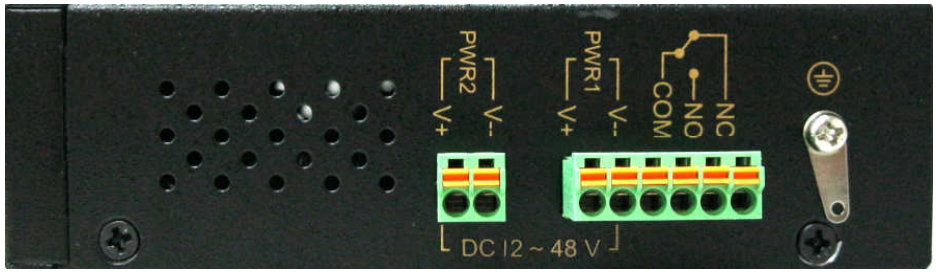
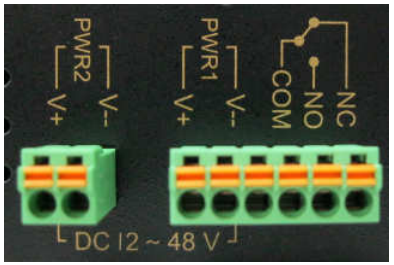


Figure 3.4 Rear connectors

The following description introduce Dual power and Relay Contact.

Wiring the dual Power Inputs

The NV-600LI/RI has two sets of power inputs, power 1 and power 2, which are located on the NV-600's side panel. Power 1 is the bottom two contacts on the upper 6-contact terminal block and power 2 is the top two contacts on the lower 2-contact terminal block.



STEP 1: Insert the negative/positive DC wires into the V-/V+ terminals, respectively.
STEP 2: Place the DC wires into terminal block connector: Push the orange switch of the terminal block with a small flat-blade screwdriver, then the DC wires insert the orange button below of the circle hole, and release the small flat-blade screwdriver.
STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the NV-600I's side panel.

Attention:

1. Please note that the negative DC wire must connect into the V- terminal, positive DC wire must connect V+terminal. If contrary to the location of the wiring, NV-600LI/RI will enable Reverse Polarity Protection function automatically. DC power will not be able to directly through the machine.
2. Please note that if the DC power current exceeds 3A, NV-600LI/RI will enable Overload Current Protection function automatically. DC power will not be able to directly through the machine.

Safety Caution!

1. **Be sure to disconnect the power when installing(uninstalling) the terminal block and power cable.**
2. **Please note that the user can use 12~48VDC dual power input(Redundant Power). Do not exceed DC 48V.**
3. **Be sure to disconnect the power before installing and/or wiring your NV-600LI/RI router.**
4. **Please calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.**

Power Input Status

The following Table shows the examples of the power input status. (Table 3-4)

Table 3-4

Power Item	Default Polarity	Example 1 Power Input1	Example 1 Output State1	Example 1 Power Input2	Example 1 Output State2	Example 2 Power Input1	Example 2 Output State1	Example 2 Power Input2	Example 2 Output State2	Example 3 Power Input1	Example 3 Output State1	Example 3 Power Input2	Example 3 Output State2
Power 1	–	12V–	OFF	12V–	ON	12V+	Protection	12V+	Protection	48V–	ON	No Power	OFF
	+	12V+		12V+		12V–		12V–		48V+			
Power 2	–	24V–	ON	No Power	OFF	24V–	ON	No Power	OFF	48V–	ON	48V–	ON
	+	24V+				24V+				48V+		48V+	

Power Item	Default Polarity	Example 4 Power Input1	Example 4 Output State1	Example 4 Power Input2	Example 4 Output State2	Example 5 Power Input1	Example 5 Output State1	Example 5 Power Input2	Example 5 Output State2	Example 6 Power Input1	Example 6 Output State1	Example 6 Power Input2	Example 6 Output State2
Power 1	–	12V–	Malfunction	12V–	Malfunction	12V–	ON	12V–	Malfunction	48V–	ON	No Power	OFF
	+	12V+		12V+		12V+		12V+		48V+			
Power 2	–	60V–	Malfunction	No Power	Malfunction	No Power	OFF	60V–	Malfunction	48V+	Protection	48V+	Protection
	+	60V+						60V+		48V–		48V–	

Notes:

1. State 1 always happens before state 2.
2. Protection means enable Reverse Polarity Protection function.
3. Please note that if use different DC voltage, higher voltage will feeding to NV-600LI or NV-600RI.
4. Please note warranty is void if exceed DC 48V.

Wiring the Relay Contact

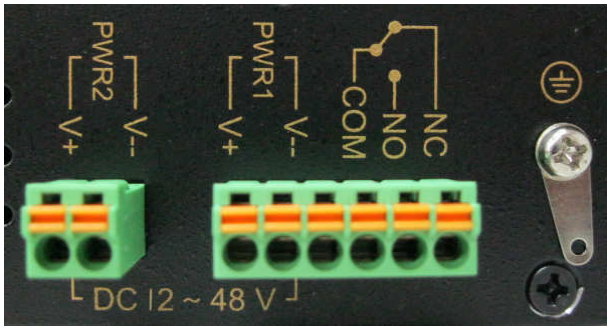
The NV-600LI/RI has a set of relay outputs. The relay contact uses two of the terminal block's contacts located on the NV-600's side panel. Refer to the following table shows how to connect the wires to the terminal block connector. In this section, we illustrate the meaning of the two contacts used to connect the relay contact.

Fault Tip:

The relay contacts of the 6-pin terminal block connector are used to detect user-configured events. The three wires attached to the fault contacts form an open circuit when a user-configured event is triggered. If a user-configured event does not occur, the fault circuit remains closed. The relay output has current carrying capacity of 1 A @ 24 VDC.

The following Table shows the Relay circuit and power status. (Table 3-5)

Table 3-5 Relay Circuit Status and Power ON/OFF Status.

	**Power ON**	**COM & NC**	**Open Circuit**
		COM & NO	**Short Circuit**
	Power OFF	**COM & NC**	**Short Circuit**
		COM & NO	**Open Circuit**

Grounding the NV-600LI/RI

NV-600LI/RI is designed to enhance EMS performance by grounding. NV-600LI/RI come with metal DIN-Rail brackets for grounding the switches. For optimal EMS performance, connection of the right of the NV-600LI/RI side panel ground lug to the grounding point.

Before user installed power and device, please read and follow these essentials:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

Note:

Do not run signal or communications wiring and power wiring through the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring sharing similar electrical characteristics can be bundled together.
- You should separate input wiring from output wiring.
- We recommend that you mark all equipment in the wiring system.

Chapter 4. Configure the NV-600LI/RI Via Web Browser

The NV-600LI/RI provides a built-in HTML based management interface that allow user configure the NV-600LI/RI via Internet Browser. Best viewed at using the Internet Explorer or Firefox and set screen resolution at 1024 x 768.

In order to use the web browser configure the device, you may need to allow:

- Web browser pop-up windows from your device. Web pop-up blocking is enabled by default in windows XP SP2 or above.
- Java Scripts. (Enabled by default)
- Java permissions. (Enabled by default)

Launch your web browser and input the IP address 192.168.16.249 (NV-600LI) or 192.168.16.250 (NV-600RI) in the Web page.

This section explains how to configure the router section of the NV-600LI/RI using its web-based configuration.

The part of the circuitry as well as the router configuration menu has been ported from that of the reference kit to the NV-600LI/RI reference board. As for the menu, there are only a few differences:

- The "adm1" port now is the port to the VDSL2 side. The port on the LAN is "adm0". It supports four Ethernet connections.

4.1 Login

The default password is "**admin**". The password is changeable in Administrator Settings.

Figure 4.1 Login Password

4.2 Select the Menu Level

There is an easy Setup for end users at the setup of NV-600LI/RI with **SYSTEM**,**WAN**, **LAN**, **NAT**, **FIREWALL**, **ROUTE**, **UPNP**, **VDSL2**, **SNMP** for more detail configurations.

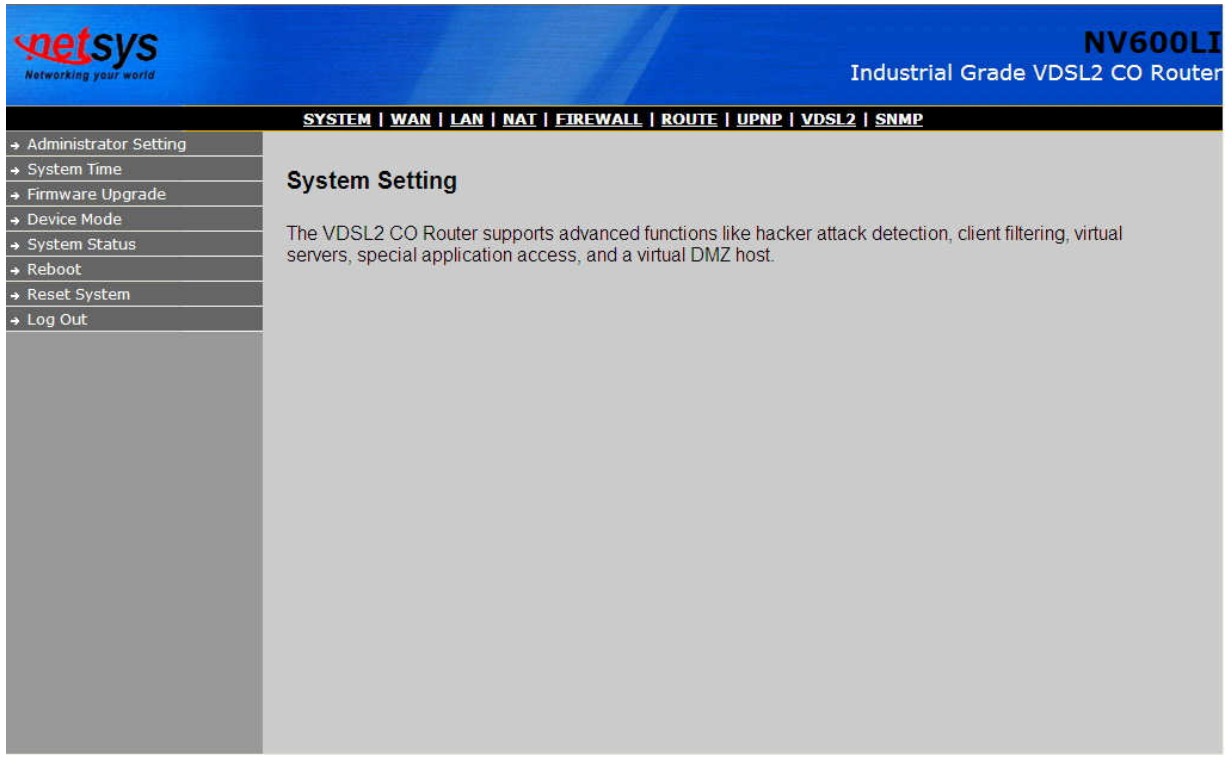

Networking your world
NV600LI
Industrial Grade VDSL2 CO Router
SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Administrator Setting
System Time
Firmware Upgrade
Device Mode
System Status
Reboot
Reset System
Log Out
System Setting
The VDSL2 CO Router supports advanced functions like hacker attack detection, client filtering, virtual servers, special application access, and a virtual DMZ host.

Figure 4.2.1 Select the Menu Level (NV-600LI)

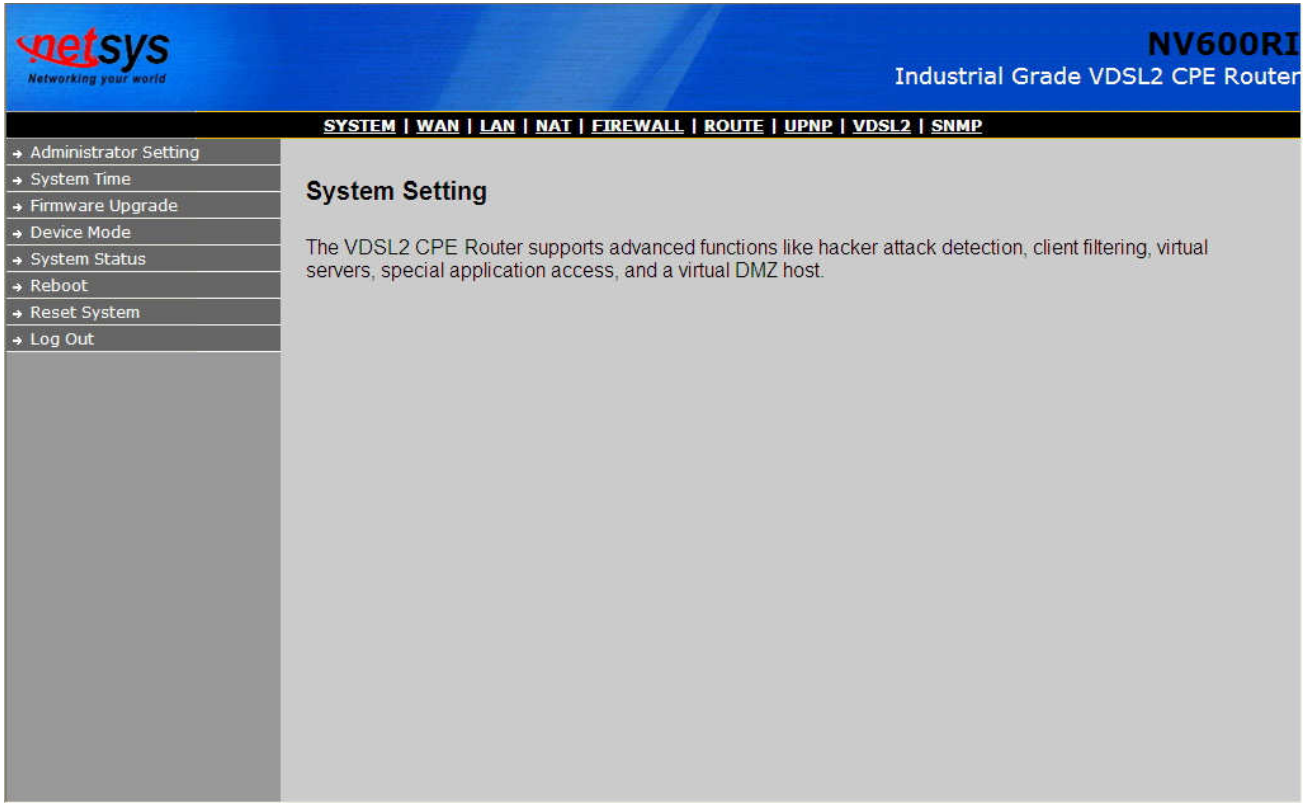

netsys
Networking your world
NV600RI
Industrial Grade VDSL2 CPE Router
SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Administrator Setting
System Time
Firmware Upgrade
Device Mode
System Status
Reboot
Reset System
Log Out
System Setting
The VDSL2 CPE Router supports advanced functions like hacker attack detection, client filtering, virtual servers, special application access, and a virtual DMZ host.

Figure 4.2.2 Select the Menu Level(NV-600RI)

4.3 Select "SYSTEM"

Select the "SYSTEM". The menu below will be used frequently. It includes the sub-menus of **Administrator Setting**、**System Time**、**Firmware Upgrade**、**Device Mode**、**System Status**、**Reboot**、**Reset System** and **Log Out**. A screen is displayed as shown in Figure 4.3

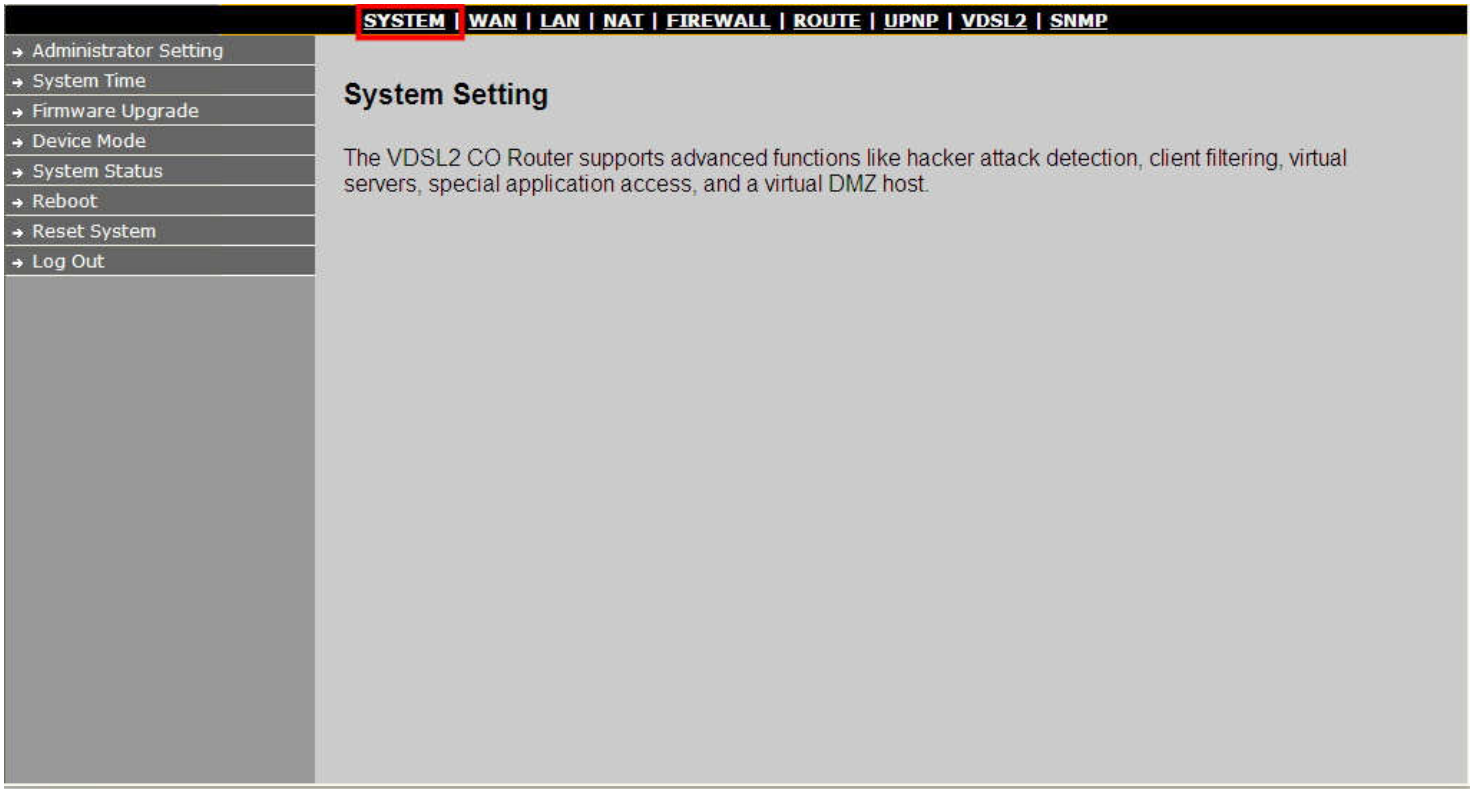

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Administrator Setting
System Time
Firmware Upgrade
Device Mode
System Status
Reboot
Reset System
Log Out
System Setting
The VDSL2 CO Router supports advanced functions like hacker attack detection, client filtering, virtual servers, special application access, and a virtual DMZ host.

Figure 4.3 System Setup

4.3.1 Administrator Setting

To add a user or change user's password, click on the "Administrator Settings" link in the left navigation bar. A screen is displayed as shown in Figure 4.3.1.

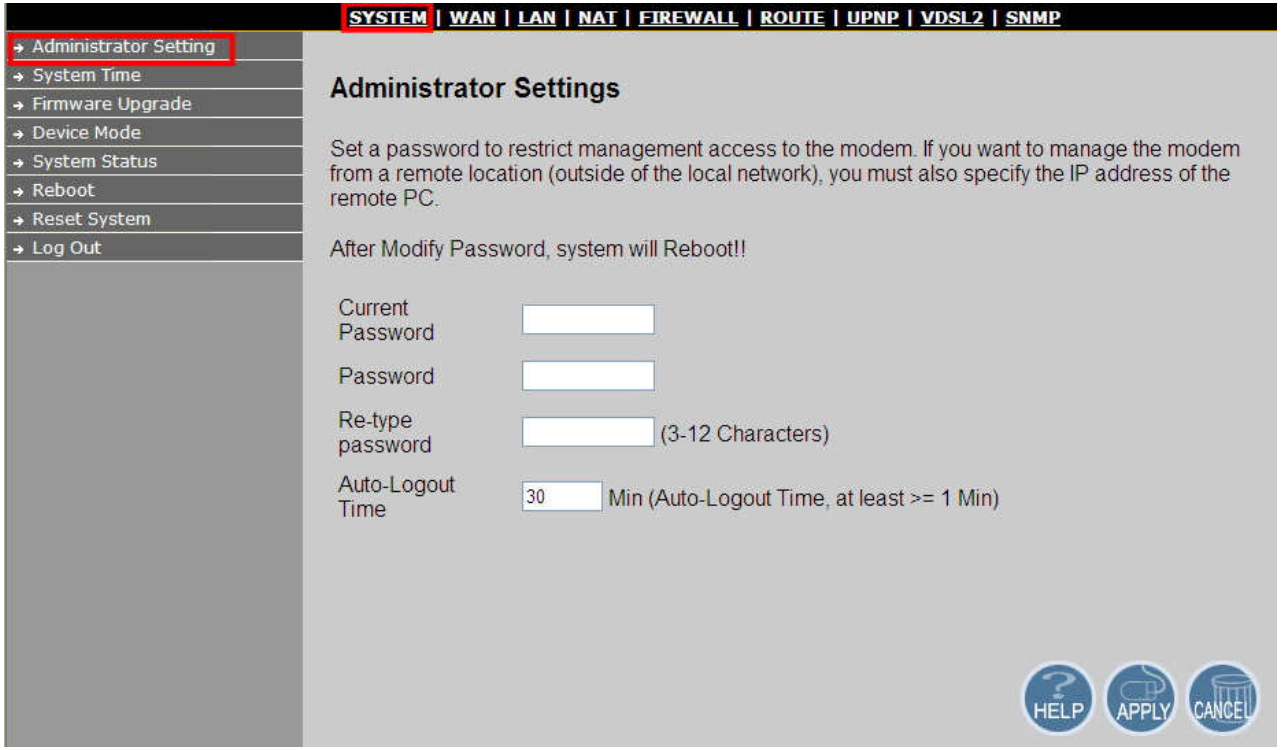

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Administrator Setting
System Time
Firmware Upgrade
Device Mode
System Status
Reboot
Reset System
Log Out
Administrator Settings
Set a password to restrict management access to the modem. If you want to manage the modem from a remote location (outside of the local network), you must also specify the IP address of the remote PC.
After Modify Password, system will Reboot!!
Current Password
Password
Re-type password
(3-12 Characters)
Auto-Logout Time
30
Min (Auto-Logout Time, at least >= 1 Min)
HELP
APPLY
CANCEL

Figure 4.3.1 Administrator Settings Configuration

- Current Password / Password Characters: 3-12.
- Auto-Logout Time: Please set at least one minute.

4.3.2 System Time

You can set System Time by connecting to a **Simple Network Time Protocol** (SNTP) server allows the Modem to synchronize the system clock to the global Internet. The synchronized clock in the Modem is used to record the security log and control client filtering. A screen is displayed as shown in Figure 4.3.2.

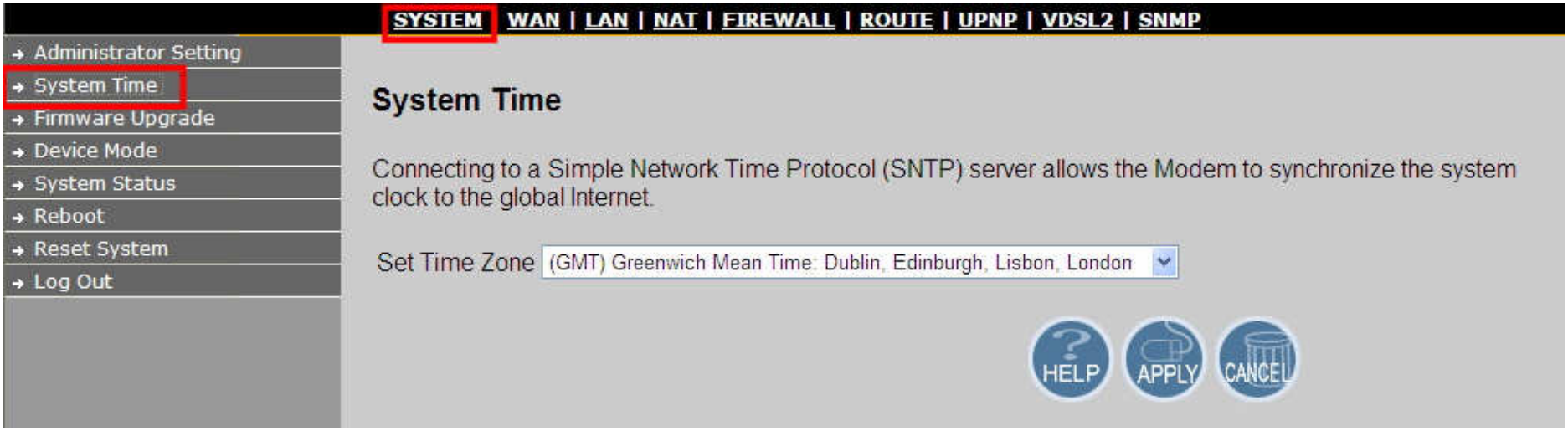

SYSTEM
WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Administrator Setting
System Time
Firmware Upgrade
Device Mode
System Status
Reboot
Reset System
Log Out
System Time
Connecting to a Simple Network Time Protocol (SNTP) server allows the Modem to synchronize the system clock to the global Internet.
Set Time Zone
(GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London
HELP
APPLY
CANCEL

Figure 4.3.2 System Time Configuration

Note:

Static Routing functionality is used to define the connected Gateway between the LAN and WAN. For example, if we want to activate the Network Time Protocol (NTP) service, and we have to define the Gateway connected to NTP server in the WAN. Please refer to section 4.8.1 for your reference.

4.3.3 Firmware Upgrade

To update the system firmware, click on the "Firmware Upgrade" link in the left navigation bar. A screen is displayed as shown in Figure 4.3.3

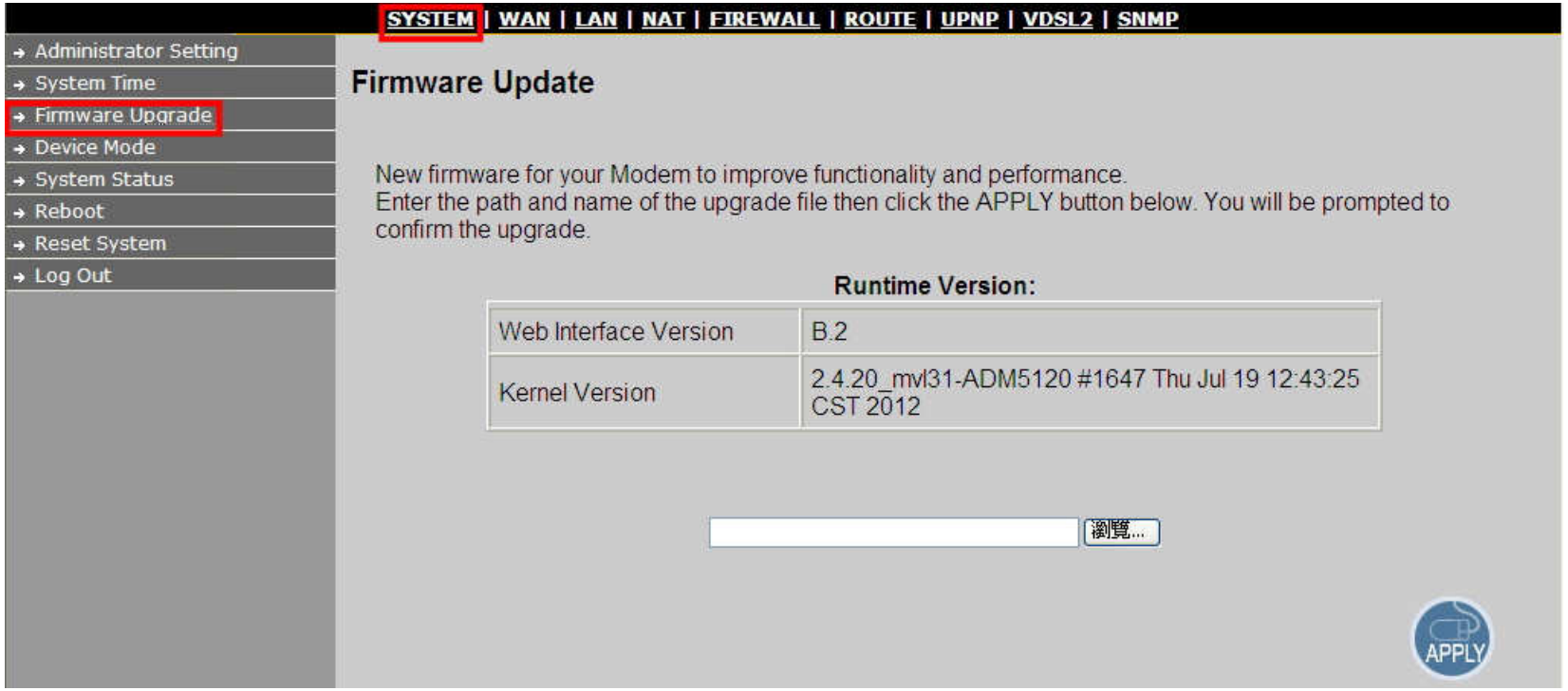

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Administrator Setting
System Time
Firmware Upgrade
Device Mode
System Status
Reboot
Reset System
Log Out
Firmware Update
New firmware for your Modem to improve functionality and performance.
Enter the path and name of the upgrade file then click the APPLY button below. You will be prompted to confirm the upgrade.
Runtime Version:
Web Interface Version
B.2
Kernel Version
2.4.20_mvl31-ADM5120 #1647 Thu Jul 19 12:43:25 CST 2012
瀏覽...
APPLY

Figure 4.3.3 Firmware Upgrade

The screen contains the following detail:

- Click "Browse" to select a specific file name in preparation upgrade the firmware.
- Click "APPLY" to start the firmware update.
- The firmware of web interface version: Web Interface Version.

Notes:

1. If the machine firmware version is too old to be updated with the current firmware version of the gap, after the firmware upgrade must be reset system to default to avoid the new features can not use or system error.
2. "2.4.20_mvl31-ADM5120" of kernel version means the CPU number of an IC. # 1647 means a serial number of records compiled firmware. The date means the date of the firmware is compiled.
3. Please note NV-600LI and NV-600RI firmware is different, so you can not upgrade them with the same firmware.

4.3.4 Device Mode

The network processor used in the reference system is able to act as either a switch or a router. Allow the user to change the mode of operation, click on the "Device Mode" link in the left navigation bar. A screen is displayed as shown in Figure 4.3.4

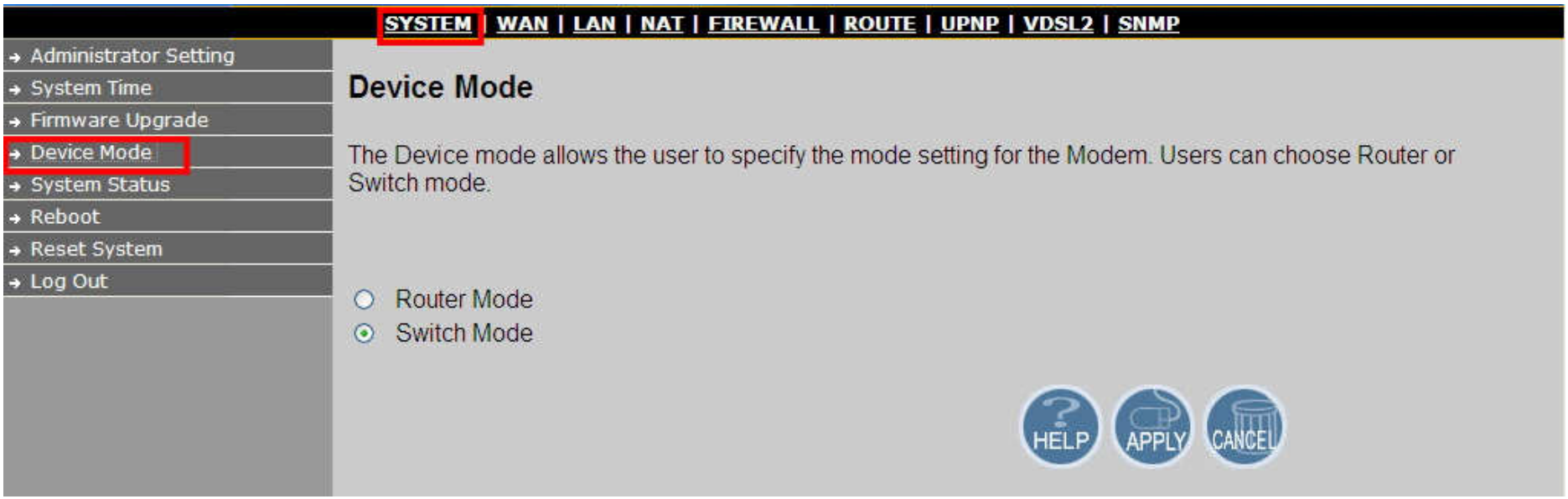


Figure 4.3.4 Device Mode

Notes:

1. The default setting is in Switch(Bridge) mode, it is not necessary to change the setting in most of the case. In situations, which devices (e.g. PC, Server, VoIP) connected to CPE requires Router function. Hence, set the NV-600LI/RI on Router mode.
2. Switch(Bridge) mode can pass through any packet, include vlan packet.

4.3.5 System Status

To view system status, click on the "System Status" link in the left navigation bar. A screen is displayed as shown in Figure 4.3.5

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Administrator Setting
System Time
Firmware Upgrade
Device Mode
System Status
Reboot
Reset System
Log Out
Status
You can use the Status screen to see the connection status for the Modems' WAN/LAN interfaces, firmware and hardware version numbers, and the number of connected clients to your network.
INTERNET
WAN IP 0.0.0.0
Subnet Mask 0.0.0.0
Gateway 0.0.0.0
DNS 0.0.0.0
Secondary DNS 0.0.0.0
Connection Type FIXED
GATEWAY
IP Address 192.168.16.217
Subnet Mask 255.255.255.0
DHCP Server Disable
Firewall Disable
INFORMATION
Connected Clients 0
Runtime Code Version 2.4.20_mvl31-ADM5120 #1647 Thu Jul 19 12:43:25 CST 2012
LAN MAC Address 00:05:6E:02:00:00
WAN MAC Address 00:05:6E:02:00:01
Hardware Version 1.00.00
HELP

Figure 4.3.5 System Status

4.3.6 Reboot

To reboot the unit, click on the "Reboot" link in the left navigation bar. A screen is displayed as shown in Figure 4.3.6

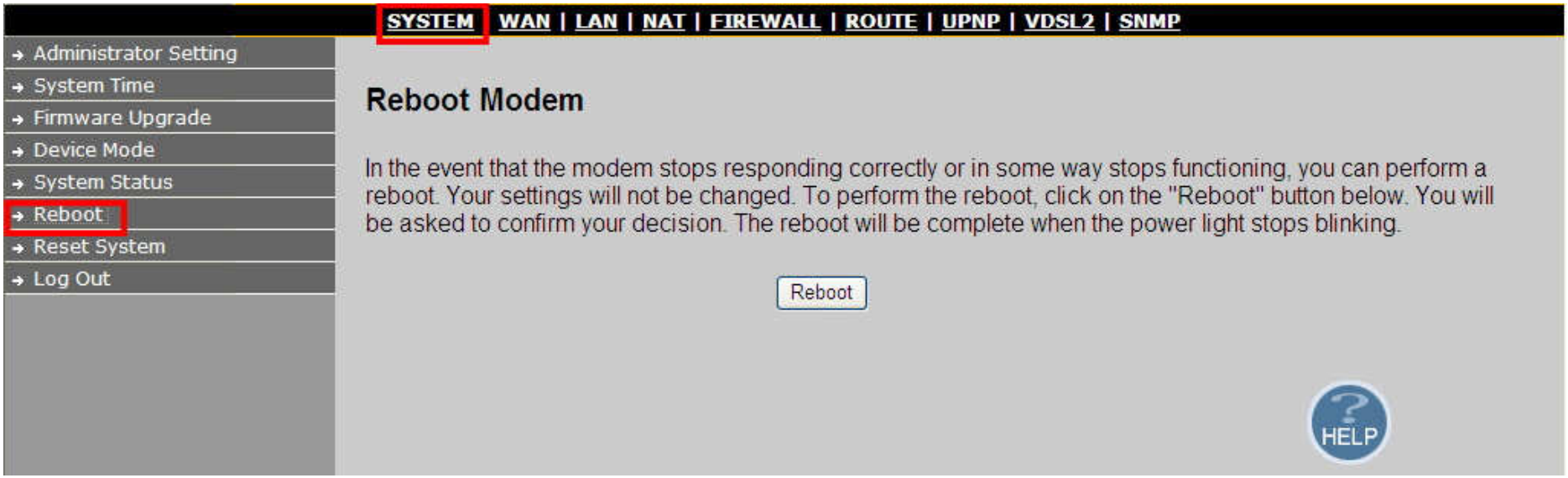

SYSTEM
WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Administrator Setting
System Time
Firmware Upgrade
Device Mode
System Status
Reboot
Reset System
Log Out
Reboot Modem
In the event that the modem stops responding correctly or in some way stops functioning, you can perform a reboot. Your settings will not be changed. To perform the reboot, click on the "Reboot" button below. You will be asked to confirm your decision. The reboot will be complete when the power light stops blinking.
Reboot
HELP

Figure 4.3.6 Reboot

- Click "Reboot" to restart the unit.
- Wait at least 30 sec and refresh the web browser.

4.3.7 Reset System

To reset system to default, click on the "Reset System" link in the left navigation bar. A screen is displayed as shown in Figure 4.3.6

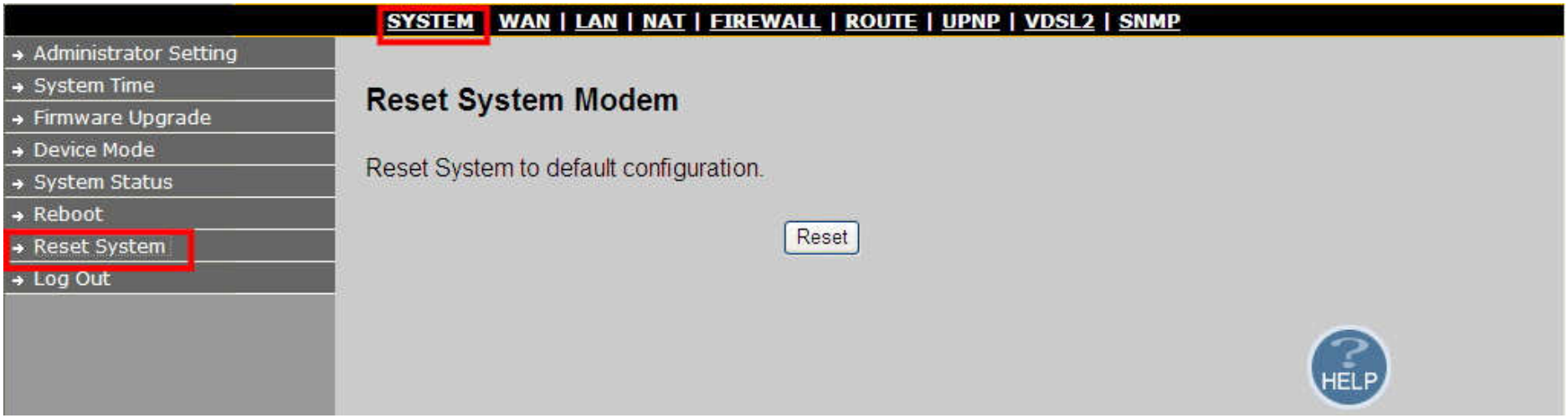


Figure 4.3.7 Reset NV-600LI/RI Router

- Click Reset button to restart the system to default configuration.
- After upgrade the firmware, and then automatically reboot.
- All settings will be cleard, and return to the default IP(192.168.16.249 / 192.168.16.250)

4.3.8 Logout

User can quit the configuration page from web ui, please click on the "Log out" link in the left navigation bar.

4.4 Select "WAN"

Select the "WAN". The menu below includes the sub-menus of **Dymanic IP**, **IP Settings**, **PPPoE** and **DNS**. A screen is displayed as shown in Figure 4.4.

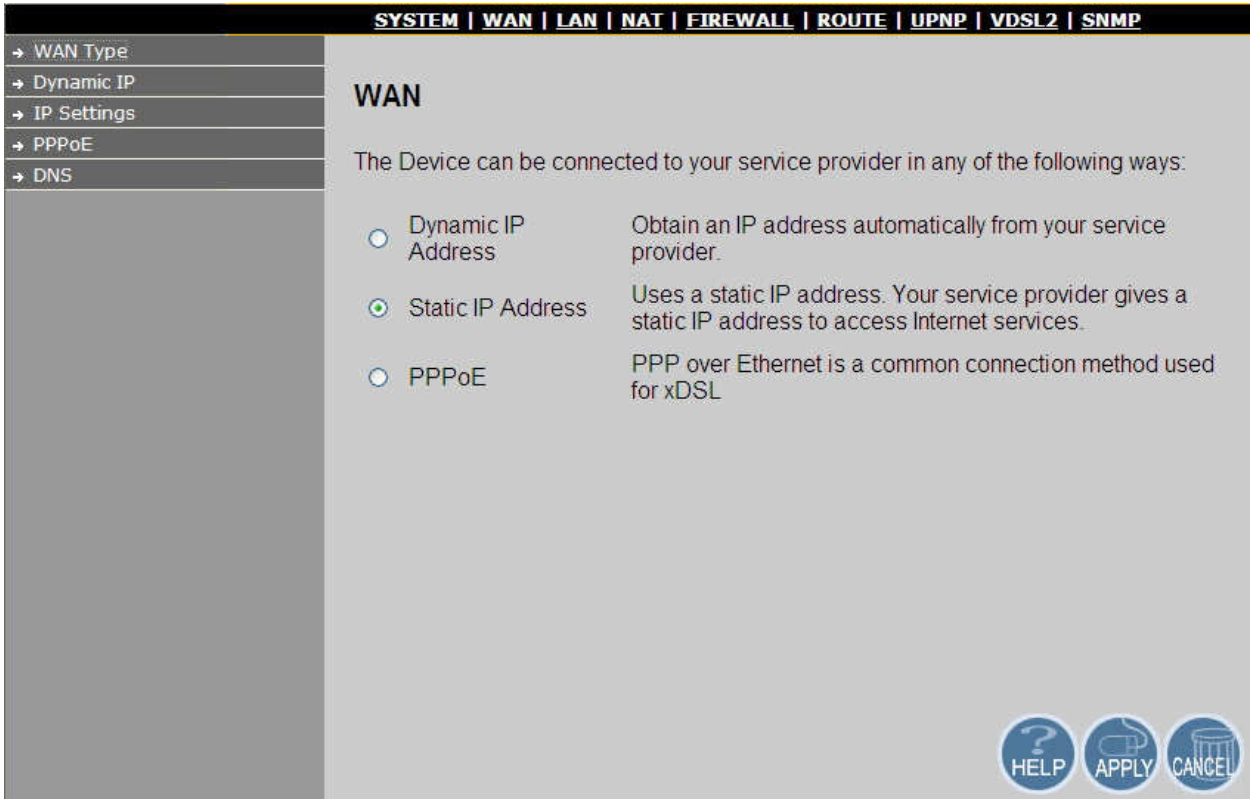

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
WAN Type
Dynamic IP
IP Settings
PPPoE
DNS
WAN
The Device can be connected to your service provider in any of the following ways:
Dynamic IP Address
Obtain an IP address automatically from your service provider.
Static IP Address
Uses a static IP address. Your service provider gives a static IP address to access Internet services.
PPPoE
PPP over Ethernet is a common connection method used for xDSL
HELP
APPLY
CANCEL

Figure 4.4 WAN type in the left navigator bar

Note:

Please select the WAN mode you need.

4.4.1 Dynamic IP

To configure the WAN interface to dynamically obtain an IP Address, click on the "Dynamic IP" link in the left navigation bar. A screen is displayed as shown in Figure 4.4.1

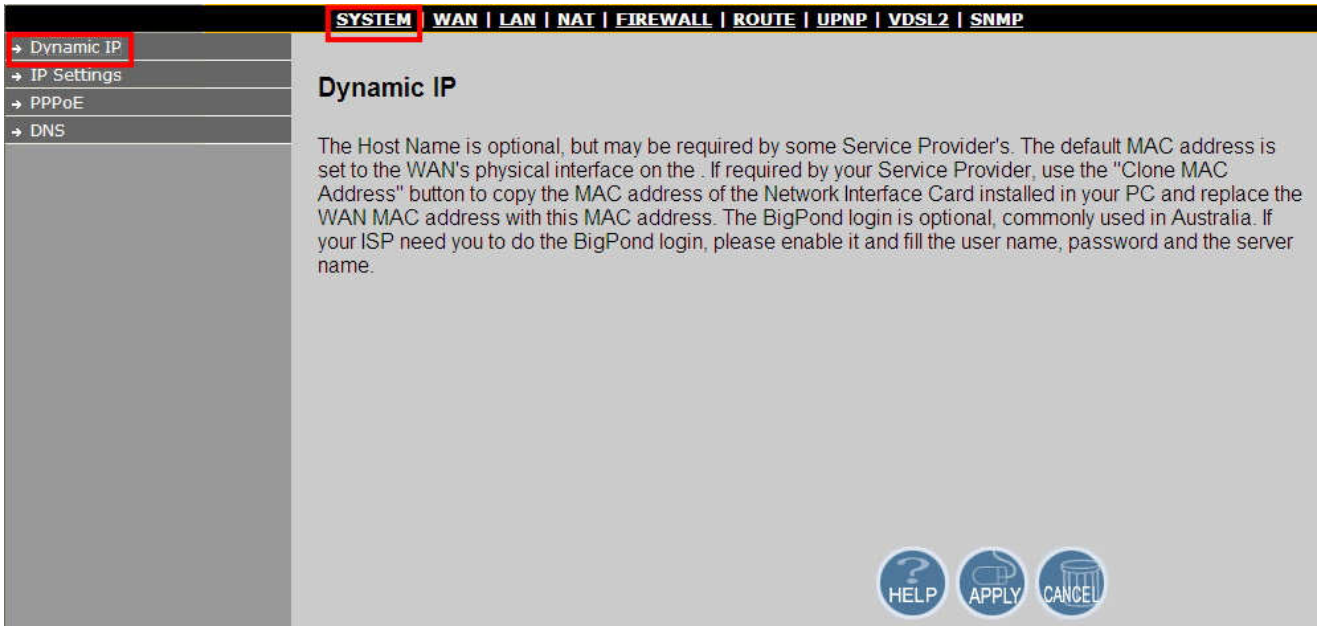

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Dynamic IP
IP Settings
PPPoE
DNS
Dynamic IP
The Host Name is optional, but may be required by some Service Provider's. The default MAC address is set to the WAN's physical interface on the . If required by your Service Provider, use the "Clone MAC Address" button to copy the MAC address of the Network Interface Card installed in your PC and replace the WAN MAC address with this MAC address. The BigPond login is optional, commonly used in Australia. If your ISP need you to do the BigPond login, please enable it and fill the user name, password and the server name.
HELP
APPLY
CANCEL

Figure 4.4.1 Dynamic IP Configuration

The screen contains the following details:

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page.

4.4.2 IP Settings

To configure the WAN interface to use a Static IP Address, click on the "Static IP" link in the left navigation bar. A screen is displayed as shown in Figure 4.4.2

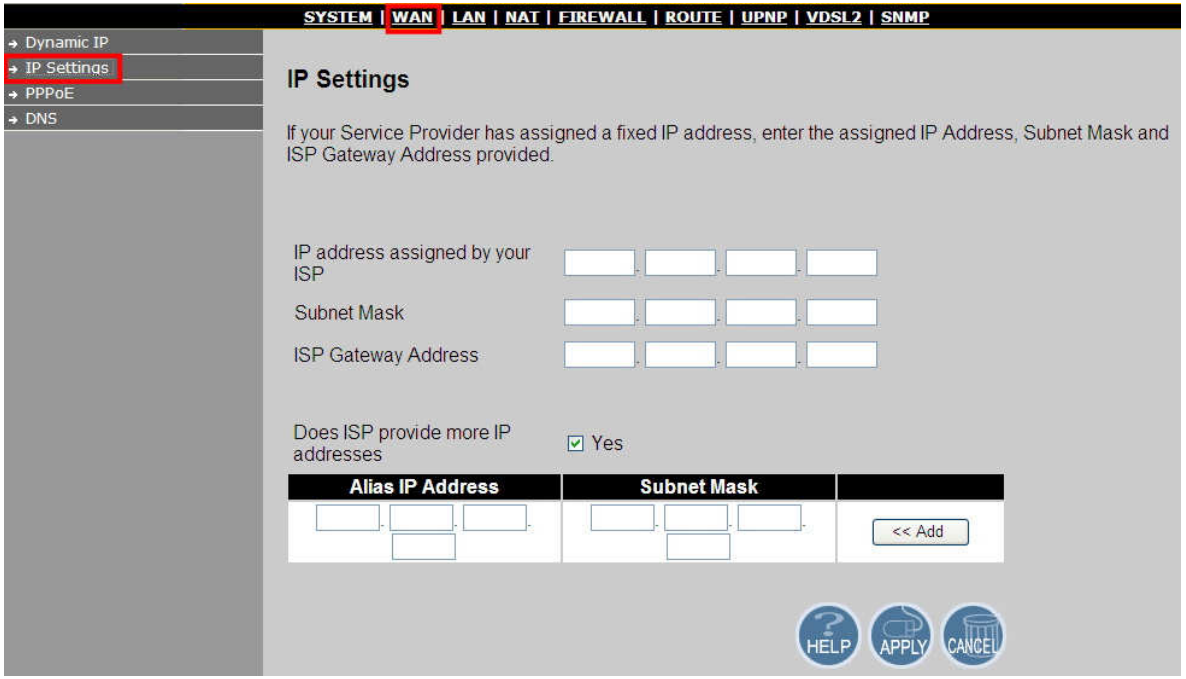

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Dynamic IP
IP Settings
PPPoE
DNS
IP Settings
If your Service Provider has assigned a fixed IP address, enter the assigned IP Address, Subnet Mask and ISP Gateway Address provided.
IP address assigned by your ISP
Subnet Mask
ISP Gateway Address
Does ISP provide more IP addresses
Yes
Alias IP Address
Subnet Mask
<< Add
HELP
APPLY
CANCEL

Figure 4.4.2 IP Settings Configuration

The screen contains the following details:

Fields in IP Settings:

Field	Description
IP Address assigned by your ISP	Enter the IP Address of NV-600LI/RI.
Subnet Mask	Enter the Subnet Mask of NV-600LI/RI.
ISP Gateway Address	Enter the Gateway address of the NV-600LI/RI.
Does ISP provide more IP Address	Provides more IP Addresses of the WAN interface. Select the check box to enable this option. A screen is displayed as shown in Figure 4.4.2. Click Add to add IP Address and Subnet Mask.
Alias IP Address	Enter the other IP address for ISP provide
Subnet Mask	Enter the other Subnet Mask for ISP provide

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

4.4.3 PPPoE

To configure the WAN interface to use PPPoE, click on the "PPPoE" link in the left navigation bar. A screen is displayed as shown in Figure 4.4.3

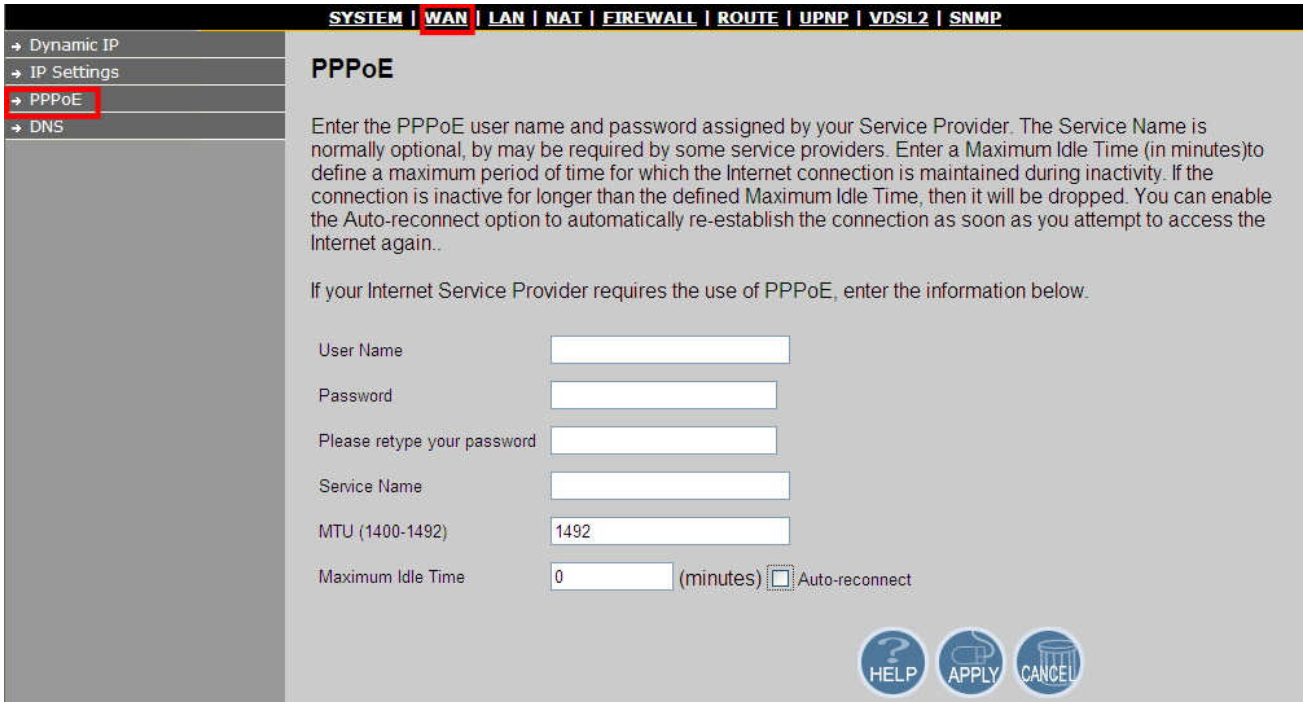

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Dynamic IP
IP Settings
PPPoE
DNS
PPPoE
Enter the PPPoE user name and password assigned by your Service Provider. The Service Name is normally optional, by may be required by some service providers. Enter a Maximum Idle Time (in minutes)to define a maximum period of time for which the Internet connection is maintained during inactivity. If the connection is inactive for longer than the defined Maximum Idle Time, then it will be dropped. You can enable the Auto-reconnect option to automatically re-establish the connection as soon as you attempt to access the Internet again..
If your Internet Service Provider requires the use of PPPoE, enter the information below.
User Name
Password
Please retype your password
Service Name
MTU (1400-1492)
1492
Maximum Idle Time
0
(minutes)
Auto-reconnect
HELP
APPLY
CANCEL

Figure 4.4.3 PPPoE Configuration

The screen contains the following details:

Fields in PPPoE:

Field	Description
User Name	Enter a name to use the PPPoE session. (50 characters maximum)
Password	Enter the password of the login user. (50 characters maximum)
Retype Password	Enter the password again to reconfirm. (50 characters maximum)
Service Name	Enter a service name. (50 characters maximum)
MTU	Enter the maximum connection units of the PPPoE. The MTU range is 1400 to 1492 bytes. By default, it is 1492.
Maximum Idle Time	This is the period of time required to keep the connection alive if no packets are transmitted. If no packets are transmitted between LAN port and WAN port or between NV-600LI/RI and WAN, the connection is disconnected after the 'Maximum idle time. If the Auto-reconnect check box is selected, the PPP connection is re-established if there is some data that is received from the upper layers to be transmitted on this link.

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

The Point-to-Point Protocol over Ethernet (PPPoE) is a network protocol for encapsulating Point-to-Point Protocol (PPP) frames inside Ethernet frames. It is used mainly with DSL services where individual users connect to the DSL modem over Ethernet and in plain Metro Ethernet networks. It was developed by UUNET, Redback Networks and RouterWare (now Wind River Systems) and is available as an informational RFC 2516.

4.4.4 DNS

To configure the DNS address, click on the "DNS" link in the left navigation bar. A screen is displayed as shown in Figure 4.4.4

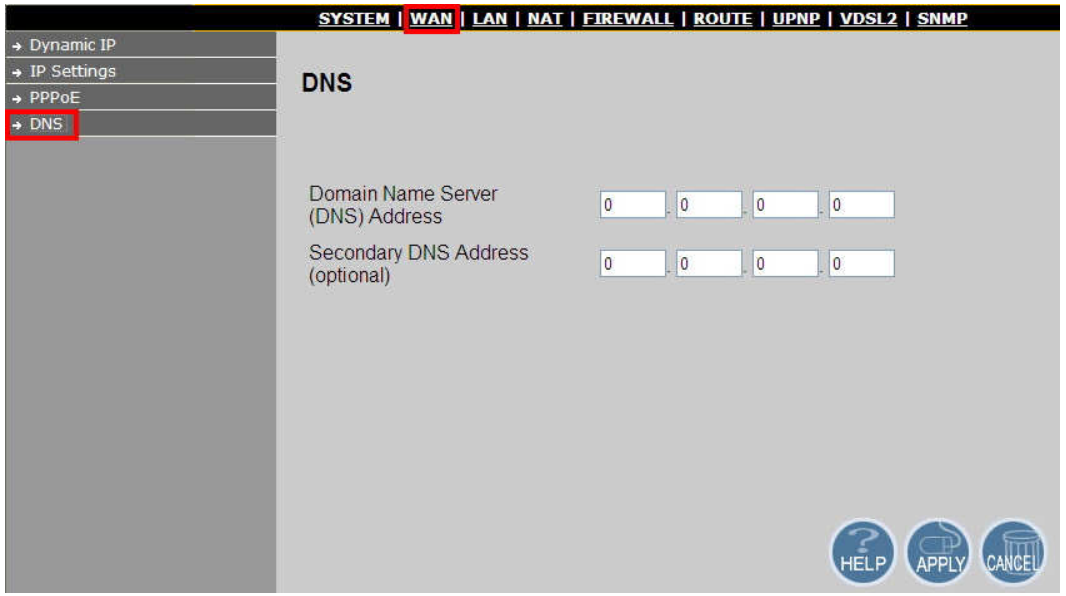


Figure 4.4.4 DNS Configuration

The screen contains the following details:

Fields in DNS:

Field	Description
Domain Name Server(DNS) Address	Enter the DNS address of the primary **DNS server**.
Secondary DNS Address(optional)	Enter the address of the secondary DNS server, if available.

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

4.5 Select "LAN"

The menu below will not be used very often, but when connecting the NV-600LI/RI to a new control PC, one may want to go through the following steps in order to make the IP address previously set by ifconfig in the console or on some later occasion one may want to change it again without using the console then the menu below will be helpful. In order to set the IP address, click on "LAN Settings".

Select the "LAN". The menu below includes the sub-menus of **LAN Settings**, **DHCP Client List**, **LAN Switch Port Setting** and **LAN Port Status**. A screen is displayed as shown in Figure 4.5.

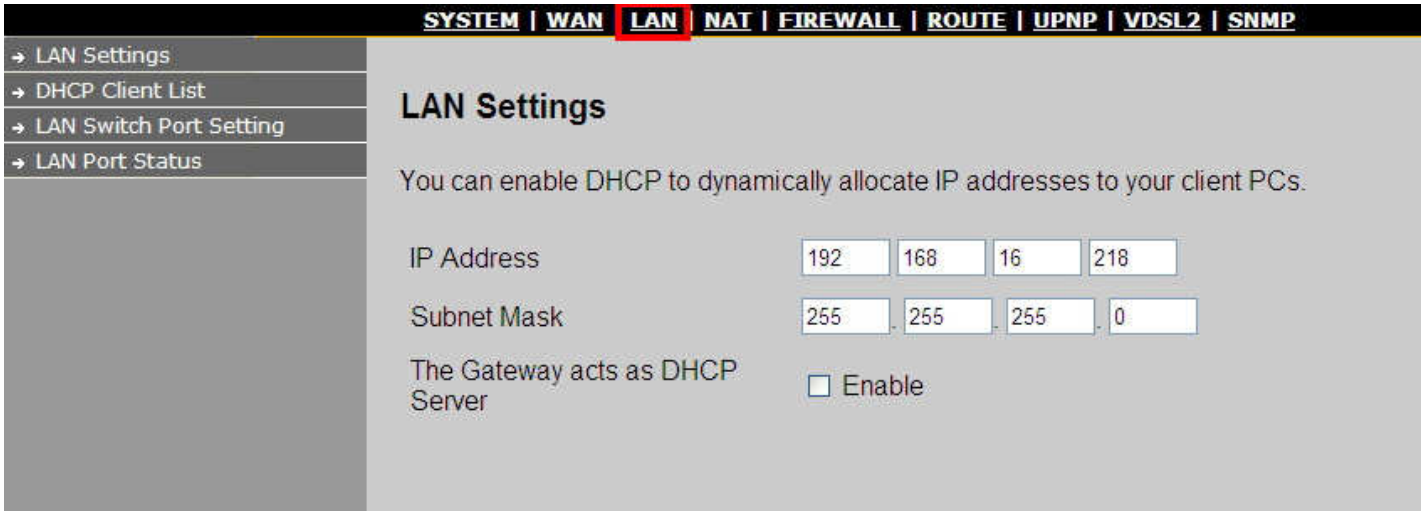


Figure 4.5 Select LAN

Note:

The settings in the Section 4.5 only need to be performed in order to change LAN settings. Such a change may be necessary when connecting the NV-600LI/RI to a new control PC and/or in order to turn the IP address changed via a shell command into a default address for the next restart of the board.

4.5.1 Select LAN Settings and set the IP Address

The form below is used to change the IP address of the LAN port "adm0" in the NV-600LI/RI.

The proposed IP address is either the default address of adm0 or it is the address changed by an ifconfig command via the shell running in the terminal. The Subnet Mask display can be ignored. In case the DHCP checkbox is checked, some additional data and options will be on display. The DHCP server is not required to work with VDSL2 in a lab environment. It recommend to uncheck the box if it is not unchecked already. A screen is displayed as shown in Figure 4.5.1

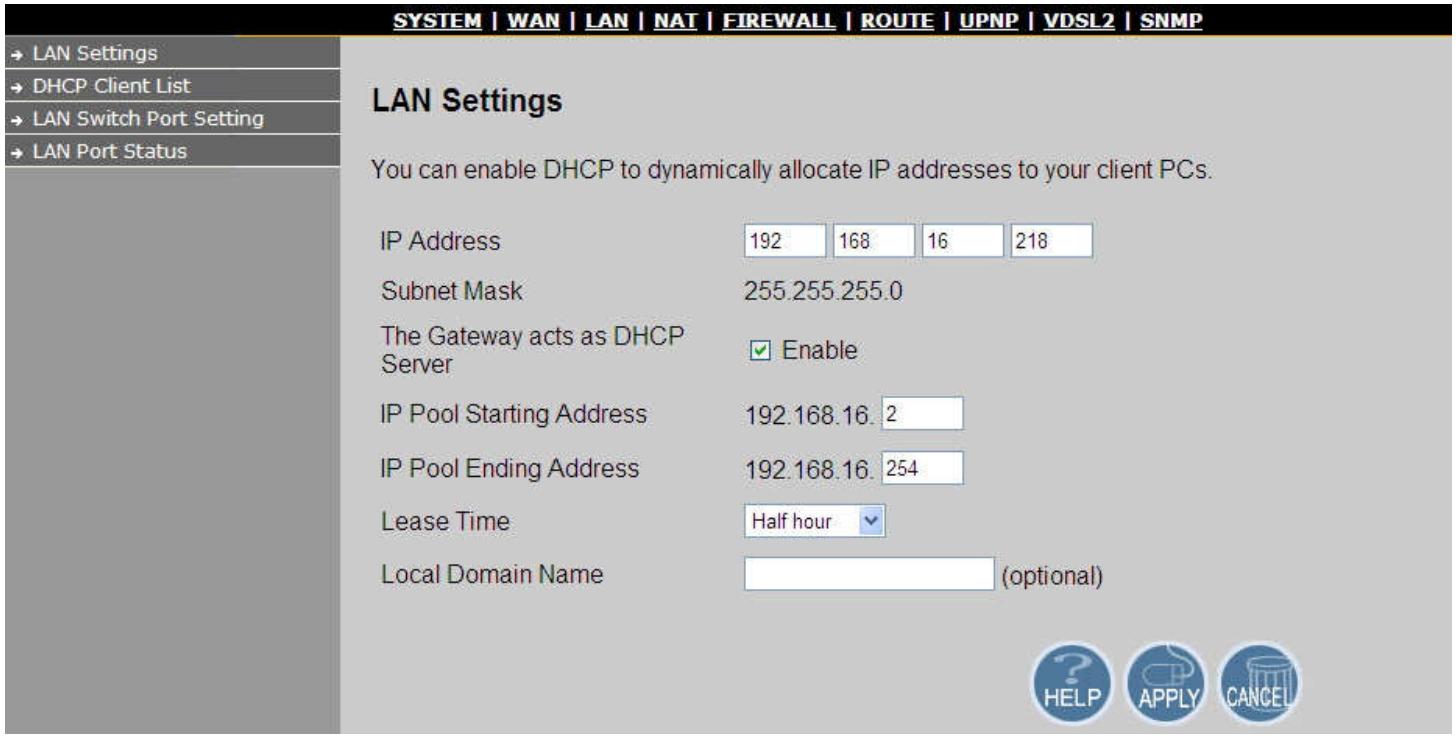


Figure 4.5.1 LAN Settings

Now the IP address either may be changed or left as it is. If it has been changed in the form or after it has been changed through console ifconfig command, it needs to be "APPLY" in order to make the displayed IP address new default address.

Note:

For the NV-600LI/RI it is recommended to select a simple IP setting suitable to controlled lab environments. Set a static IP address and don't use DHCP.

The screen contains the following details:

Fields in LAN Settings:

Field	Description
IP Address	Enter the LAN interface IP Address of NV-600LI/RI. (Web IP)
Subnet Mask	Enter the LAN Subnet Mask of NV-600LI/RI.
The Gateway acts as DHCP Server	Enable or disables the DHCP Server of the NV-600LI/RI. Select the check-box to enable this option.
IP Pool Starting Address	Enter the starting IP Pool Address.
IP Pool Ending Address	Enter the ending IP Pool Address.
Lease Time	Enter the Lease Time from half hour to two weeks.
Local Domain Name	Enter the Local Domain Name but is optional.

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

4.5.2 DHCP Client List

The DHCP client list allows you to see which clients are connected to the VDSL2 CPE Modem via IP address, host name, and MAC address. To view the DHCP client list, click on the "DHCP Client List" link in the left navigation bar. A screen is displayed to list all DHCP client connection with IP Address and MAC Address as shown in Figure 4.5.2

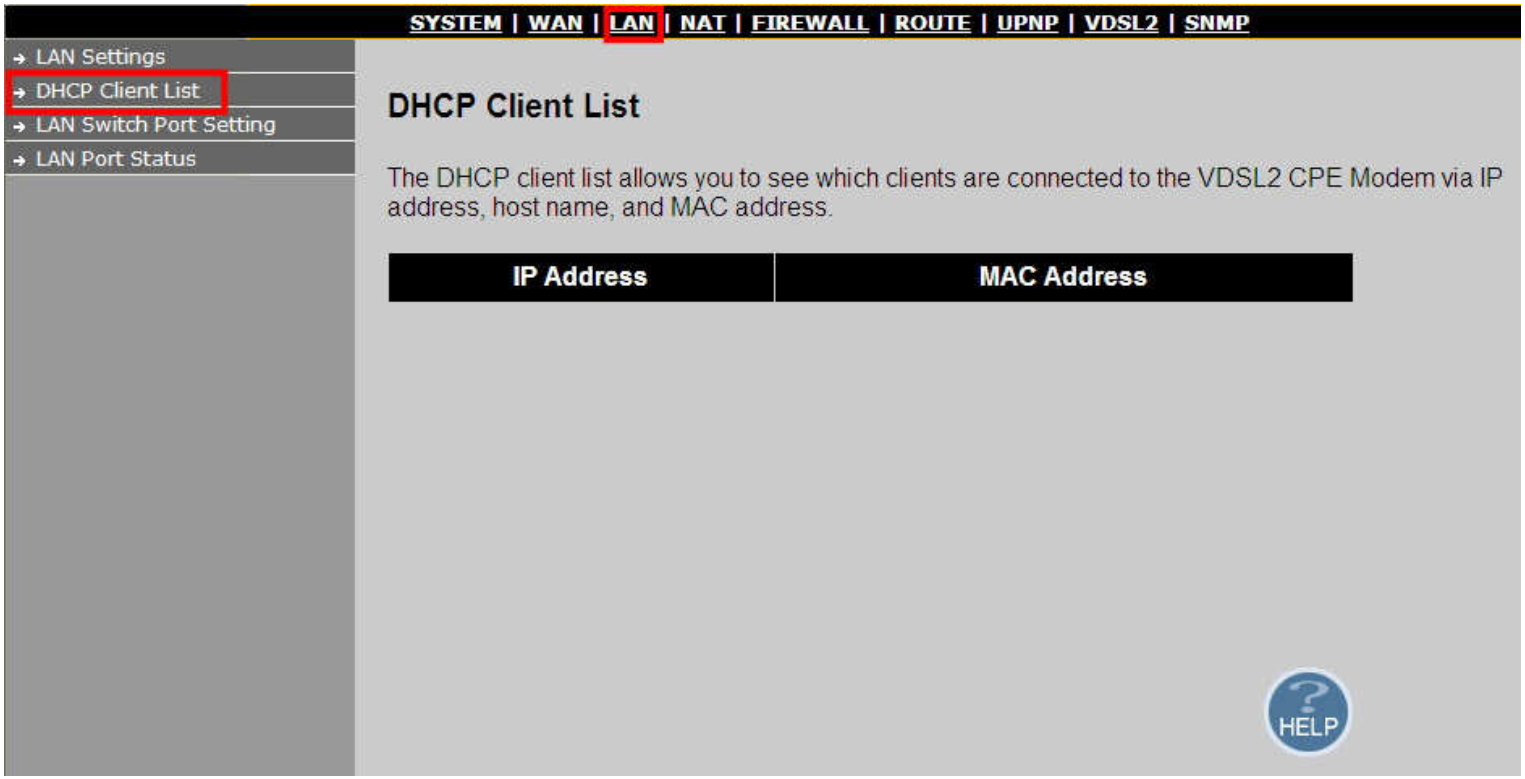

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
LAN Settings
DHCP Client List
LAN Switch Port Setting
LAN Port Status
DHCP Client List
The DHCP client list allows you to see which clients are connected to the VDSL2 CPE Modem via IP address, host name, and MAC address.
IP Address
MAC Address
HELP

Figure 4.5.2 DHCP Client List

4.5.3 LAN Switch Port Setting

To view the All LAN Port Setting, click on the "Lan Switch Port Setting" link in the left navigation bar. A screen is displayed to all LAN Port Setting as shown in Figure 4.5.3

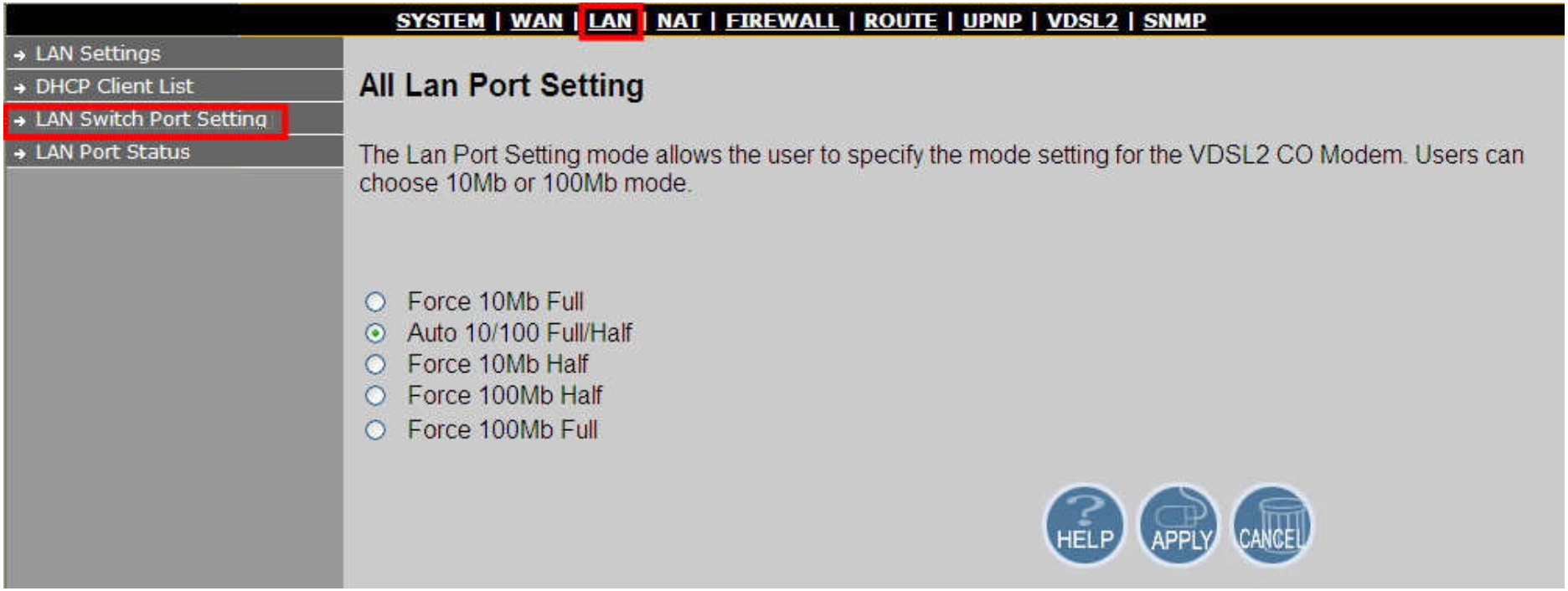

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
LAN Settings
DHCP Client List
LAN Switch Port Setting
LAN Port Status
All Lan Port Setting
The Lan Port Setting mode allows the user to specify the mode setting for the VDSL2 CO Modem. Users can choose 10Mb or 100Mb mode.
Force 10Mb Full
Auto 10/100 Full/Half
Force 10Mb Half
Force 100Mb Half
Force 100Mb Full
HELP
APPLY
CANCEL

Figure 4.5.3 LAN Switch Port Setting

- Default value is "Auto 10/100 Full/Half".
- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

4.5.4 LAN Port Status

To view the All LAN Port Status, click on the "Lan Port Status" link in the left navigation bar.The following information provides a view of the current Ethernet ports status of the unit. A screen is displayed to Status as shown in Figure 4.5.4

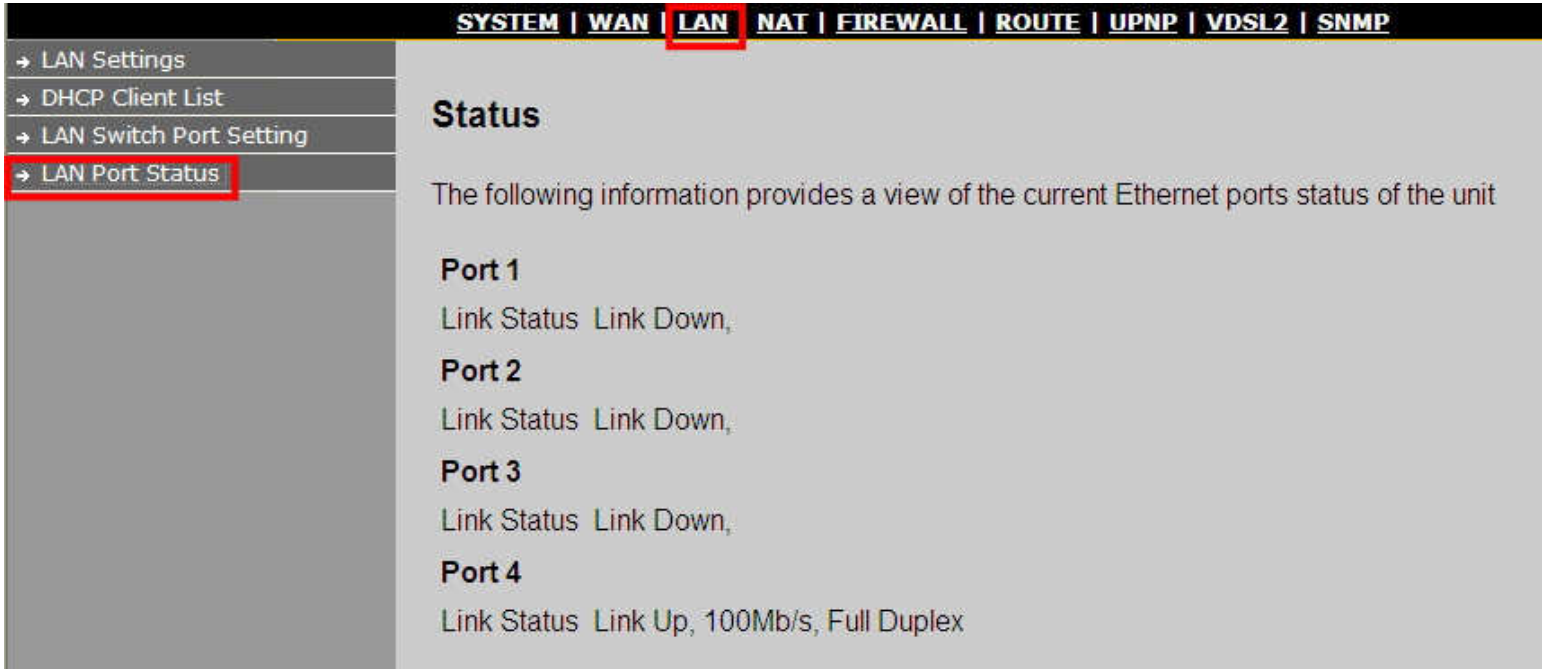

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
LAN Settings
DHCP Client List
LAN Switch Port Setting
LAN Port Status
Status
The following information provides a view of the current Ethernet ports status of the unit
Port 1
Link Status Link Down,
Port 2
Link Status Link Down,
Port 3
Link Status Link Down,
Port 4
Link Status Link Up, 100Mb/s, Full Duplex

Figure 4.5.4 LAN Port Status

Example Table:

Input 1	Output 1	Input 2	Output 2	Input 3	Output 3	Input 4	Output 4
NWAY 10M Full	10M Full	Force 10M Full	10M Half	None	Link Down	NWAY 10M Half	10M Half
Input 5	**Output 5**	**Input 6**	**Output 6**	**Input 7**	**Output 7**	**Input 8**	**Output 8**
NWAY 100M Half	100M Half	Force 100M Full	100M Half	Auto 100M Full	100M full	Auto	100M FULL

4.6 Select "NAT"

Network Address Translation(NAT) allows multiple users at your local site to access the internet through a single public IP address or multiple public IP address. NAT can also prevent hacker attacks by mapping local address to public address for key services such as the Web or FTP.

Select the "NAT". The menu below includes the sub-menus of **Virtual Server**, **Port Mapping**and **DMZ**. A screen is displayed as shown in Figure 4.6.

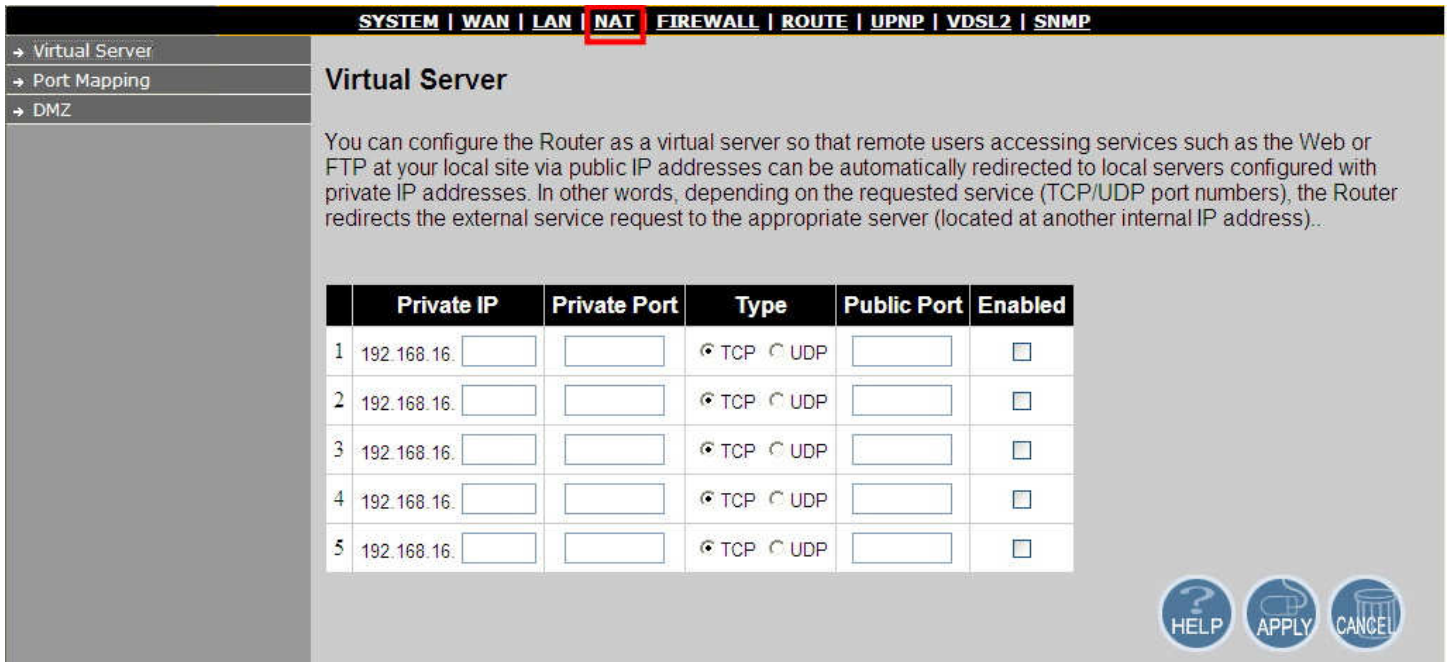

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Virtual Server
Port Mapping
DMZ
Virtual Server
You can configure the Router as a virtual server so that remote users accessing services such as the Web or FTP at your local site via public IP addresses can be automatically redirected to local servers configured with private IP addresses. In other words, depending on the requested service (TCP/UDP port numbers), the Router redirects the external service request to the appropriate server (located at another internal IP address)..
Private IP
Private Port
Type
Public Port
Enabled
1 192.168.16. TCP UDP
2 192.168.16. TCP UDP
3 192.168.16. TCP UDP
4 192.168.16. TCP UDP
5 192.168.16. TCP UDP
HELP
APPLY
CANCEL

Figure 4.6 NAT type in the left navigator bar

4.6.1 Virtual Server

You can configure the Router as a virtual server so that remote users accessing services such as the Web or FTP at your local site via public IP addresses can be automatically redirected to local servers configured with private IP addresses. In other words, depending on the requested service (TCP/UDP port numbers), the Router redirects the external service request to the appropriate server (located at another internal IP address).

To configure virtual server, click on the "**Virtual Server**" link in the left navigation bar. A screen is displayed as shown in Figure 4.6.1

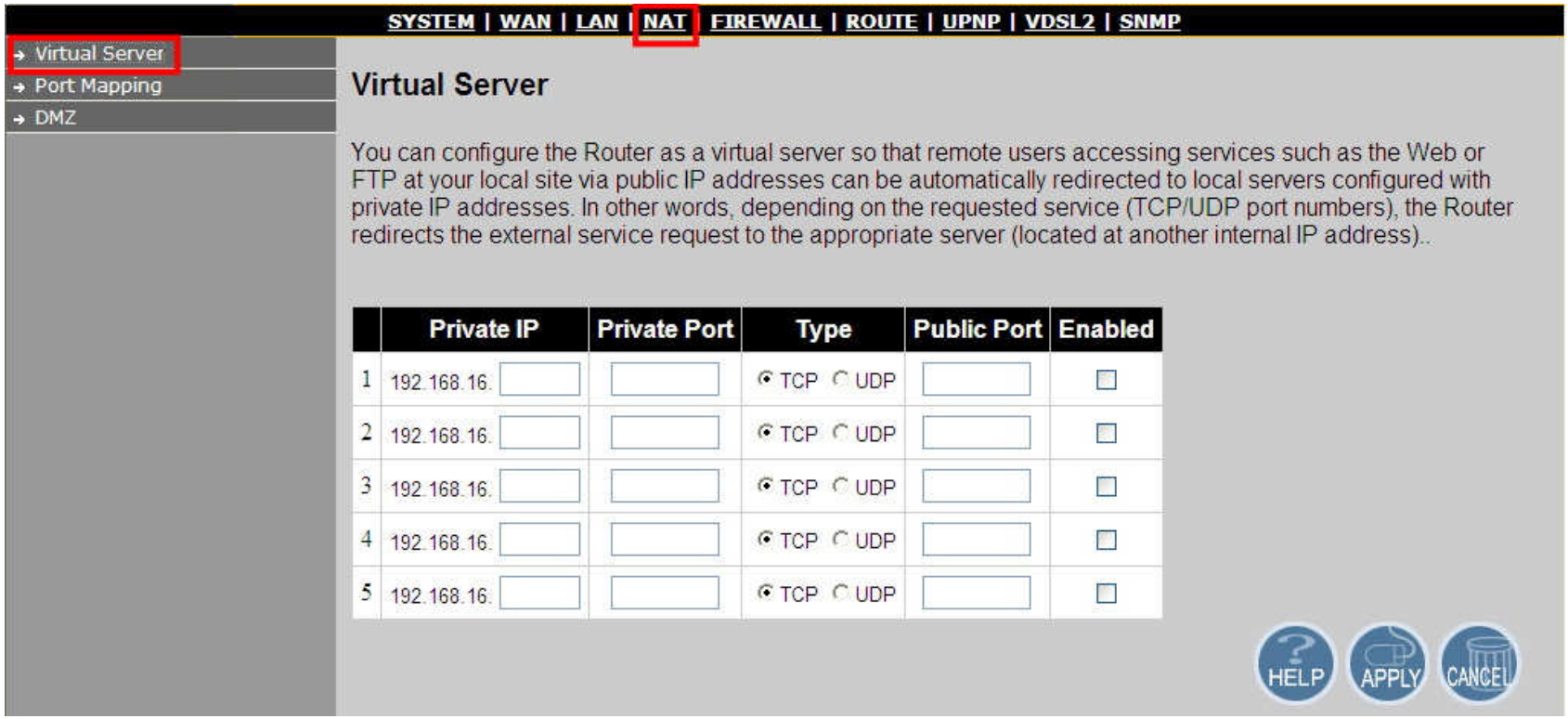

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Virtual Server
Port Mapping
DMZ
Virtual Server
You can configure the Router as a virtual server so that remote users accessing services such as the Web or FTP at your local site via public IP addresses can be automatically redirected to local servers configured with private IP addresses. In other words, depending on the requested service (TCP/UDP port numbers), the Router redirects the external service request to the appropriate server (located at another internal IP address)..
Private IP
Private Port
Type
Public Port
Enabled
1 192.168.16. TCP UDP
2 192.168.16. TCP UDP
3 192.168.16. TCP UDP
4 192.168.16. TCP UDP
5 192.168.16. TCP UDP
HELP
APPLY
CANCEL

Figure 4.6.1 Virtual Server Configuration

The screen contains the following details:

Fields in Virtual Server:

Field	Description
Private IP	Enter a private IP Address of specified entry.
Private Port	Enter a private Port number of the specified entry.
Type	Select virtual server protocol type of the specified entry.
Public Port	Enter a public port number of the internet user to access the virtual server.
Enabled	Enable the specified entry of the virtual server.

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

4.6.2 Virtual Server

For some applications, you need to assign a set or a range of ports to a specified local machine to route the packets. Router allows the user to configure the needed port mappings to suit such applications.

To configure Port Mapping, click on the "Port Mapping" link in the left navigation bar. A screen is displayed as shown in Figure 4.6.2

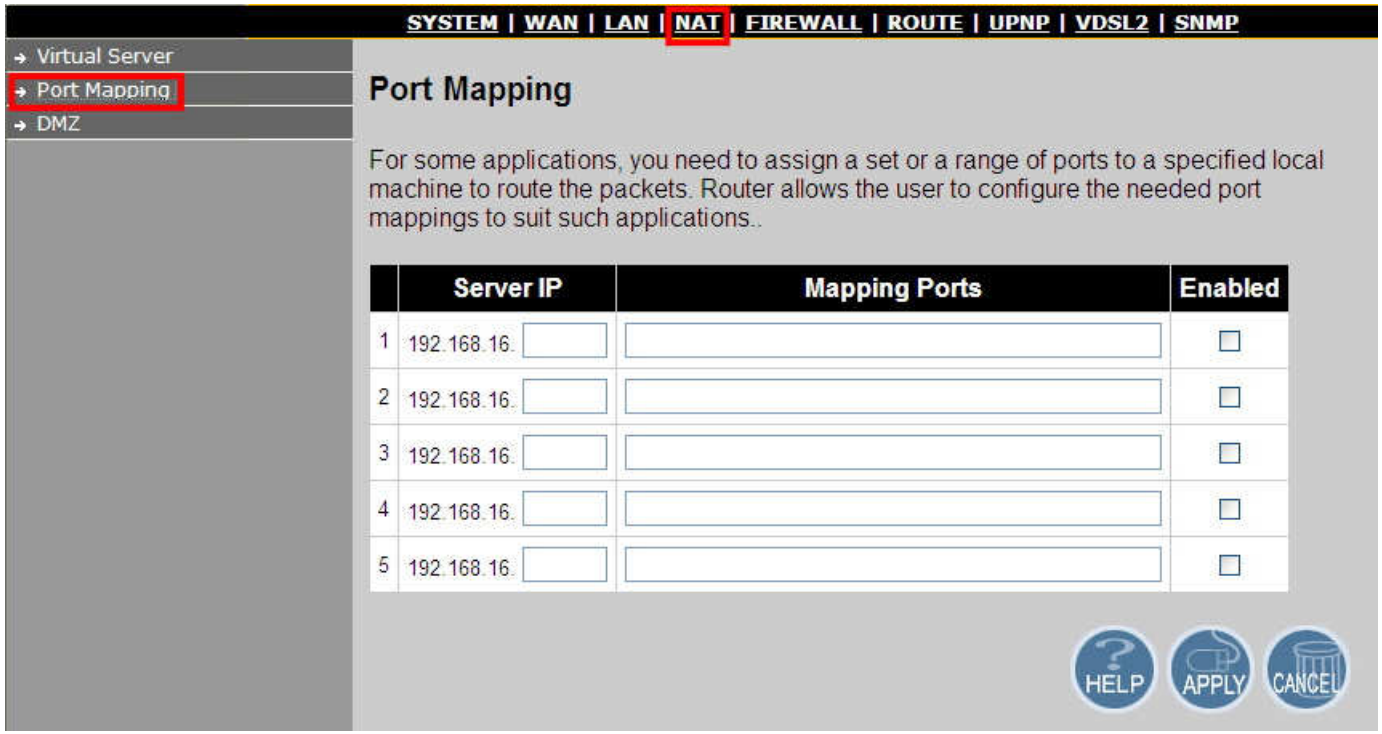

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Virtual Server
Port Mapping
DMZ
Port Mapping
For some applications, you need to assign a set or a range of ports to a specified local machine to route the packets. Router allows the user to configure the needed port mappings to suit such applications..
Server IP
Mapping Ports
Enabled
1 192.168.16.
2 192.168.16.
3 192.168.16.
4 192.168.16.
5 192.168.16.
HELP
APPLY
CANCEL

Figure 4.6.2 Port Mapping Configuration

The screen contains the following details:

Fields in Port Mapping:

Field	Description
Server IP	Enter the IP Address of a specified local machine.
Mapping Port	Assign a range of port or specific port number to route the packets.
Enabled	Enable a specified entry of the Port Mapping.

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

4.6.3 DMZ

If you have a local client PC that cannot run an Internet application properly from behind the NAT firewall, you can open the client up to unrestricted two-way Internet access by defining a virtual DMZ Host.

To configure the DMZ, click on the "DMZ" link in the left navigation bar. A screen is displayed as shown in Figure 4.6.3

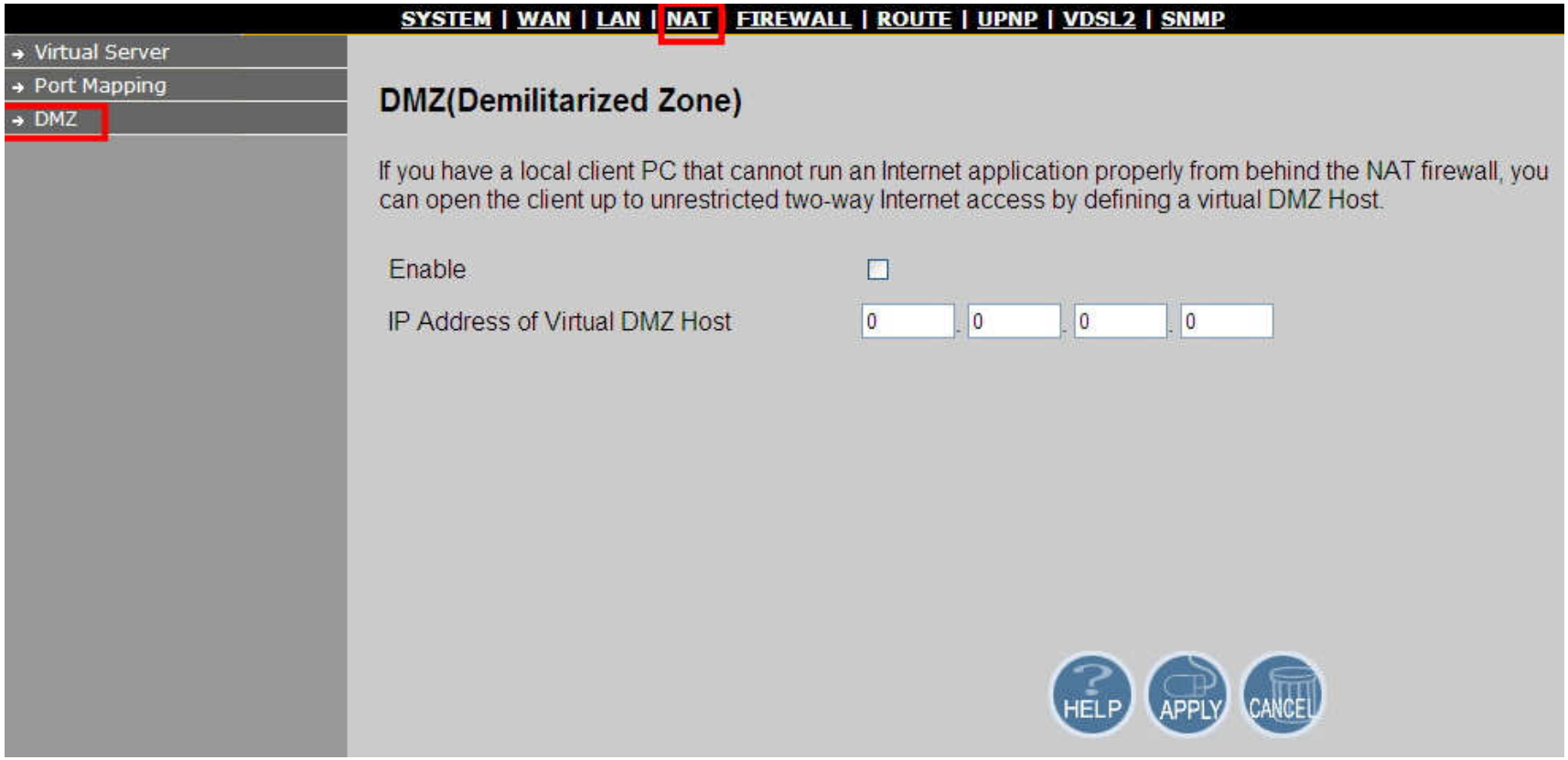

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Virtual Server
Port Mapping
DMZ
DMZ(Demilitarized Zone)
If you have a local client PC that cannot run an Internet application properly from behind the NAT firewall, you can open the client up to unrestricted two-way Internet access by defining a virtual DMZ Host.
Enable
IP Address of Virtual DMZ Host
0 . 0 . 0 . 0
HELP
APPLY
CANCEL

Figure 4.6.3 DMZ Configuration

The screen contains the following details:

Fields in DMZ:

Field	Description
Enable	Enable or disable the DMZ setting of NV-600LI/RI. Select the check box to enable this option.
IP Address	Enter IP Address of the DMZ host.

- Click APPLY to save the information that has been entered.

4.7 Select "Firewall"

The industrial-grade VDSL2 router provides extensive firewall protection by restricting connection parameters to limit the risk of instrusion and defending against a wide array of common hacker attacks. However, for applications the require unrestricted access to the internet, you can configure a specific client/server a demilitarized zone(DMZ).

Select the "Firewall". The menu below includes the sub-menus of **Firewall Options**, **Client Filtering**and **MAC Control**. A screen is displayed as shown in Figure 4.7.

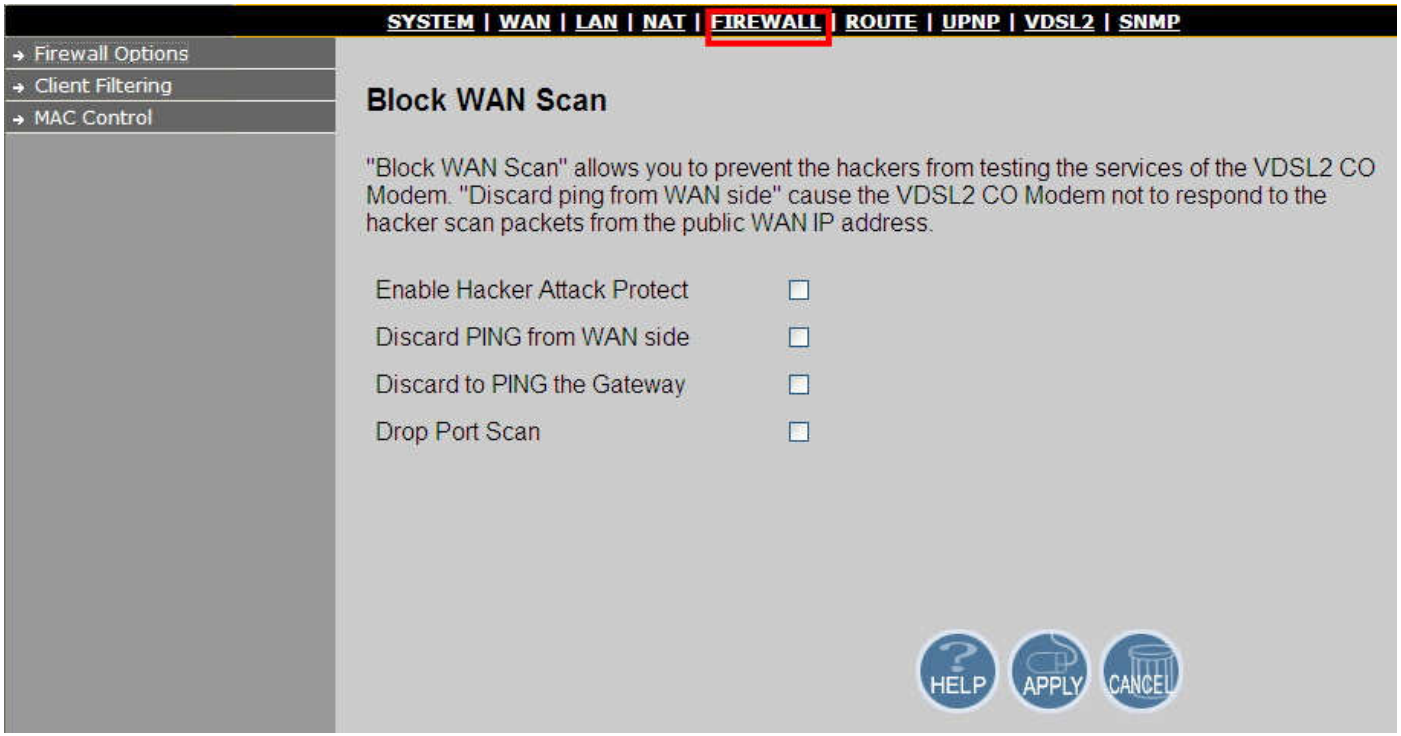

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Firewall Options
Client Filtering
MAC Control
Block WAN Scan
"Block WAN Scan" allows you to prevent the hackers from testing the services of the VDSL2 CO Modem. "Discard ping from WAN side" cause the VDSL2 CO Modem not to respond to the hacker scan packets from the public WAN IP address.
Enable Hacker Attack Protect
Discard PING from WAN side
Discard to PING the Gateway
Drop Port Scan
HELP
APPLY
CANCEL

Figure 4.7 Firewall in Left Navigator Bar

4.7.1 Firewall Options

"Block WAN Scan" allows you to prevent the hackers from testing the services of the VDSL2 CO Modem. "Discard ping from WAN side" cause the VDSL2 CO Modem not to respond to the hacker scan packets from the public WAN IP address.

To enable the firewall options, click on the "Firewall Options" link in the left navigation bar. A screen is displayed as shown in Figure 4.7.1

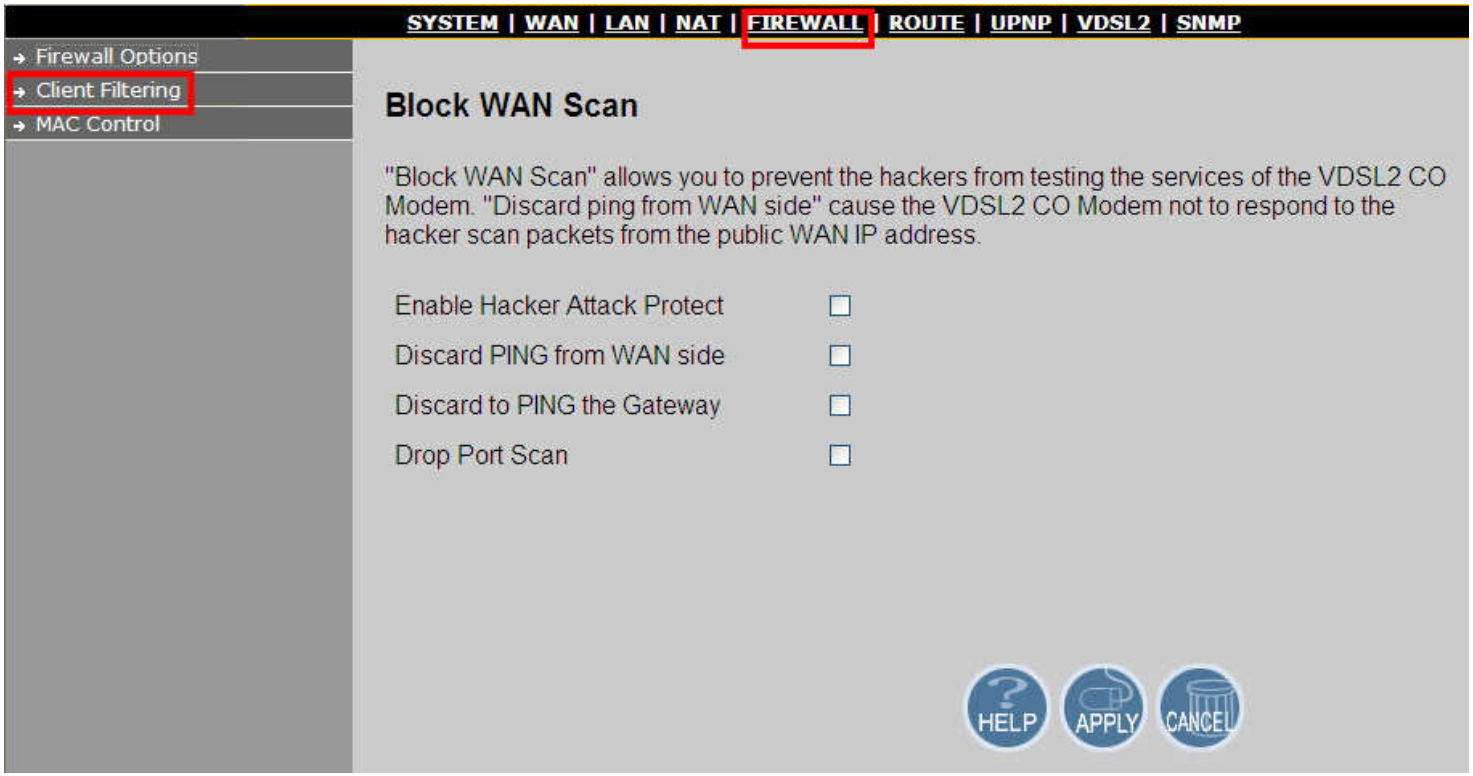

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Firewall Options
Client Filtering
MAC Control
Block WAN Scan
"Block WAN Scan" allows you to prevent the hackers from testing the services of the VDSL2 CO Modem. "Discard ping from WAN side" cause the VDSL2 CO Modem not to respond to the hacker scan packets from the public WAN IP address.
Enable Hacker Attack Protect
Discard PING from WAN side
Discard to PING the Gateway
Drop Port Scan
HELP
APPLY
CANCEL

Figure 4.7.1 Firewall Options Configuration

The screen contains the following details:

Fields in Firewall Options:

Field	Description
Enable Hacker Attack Protect	Select the check box to log and drop all the hacker attack events.
Discard PING from WAN	Select the check box to drop all PING from the WAN side.
Discard PING the Gateway	Select the check box to drop all PING to NV-600LI/RI packet for the LAN side.
Drop Port Scan	Select the check box to drop all the port scan packets.

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

4.7.2 Client Filtering

To enable Client Filter, click on the "Client Filtering" link in the left navigation bar. A screen is displayed as shown in Figure 4.7.2.

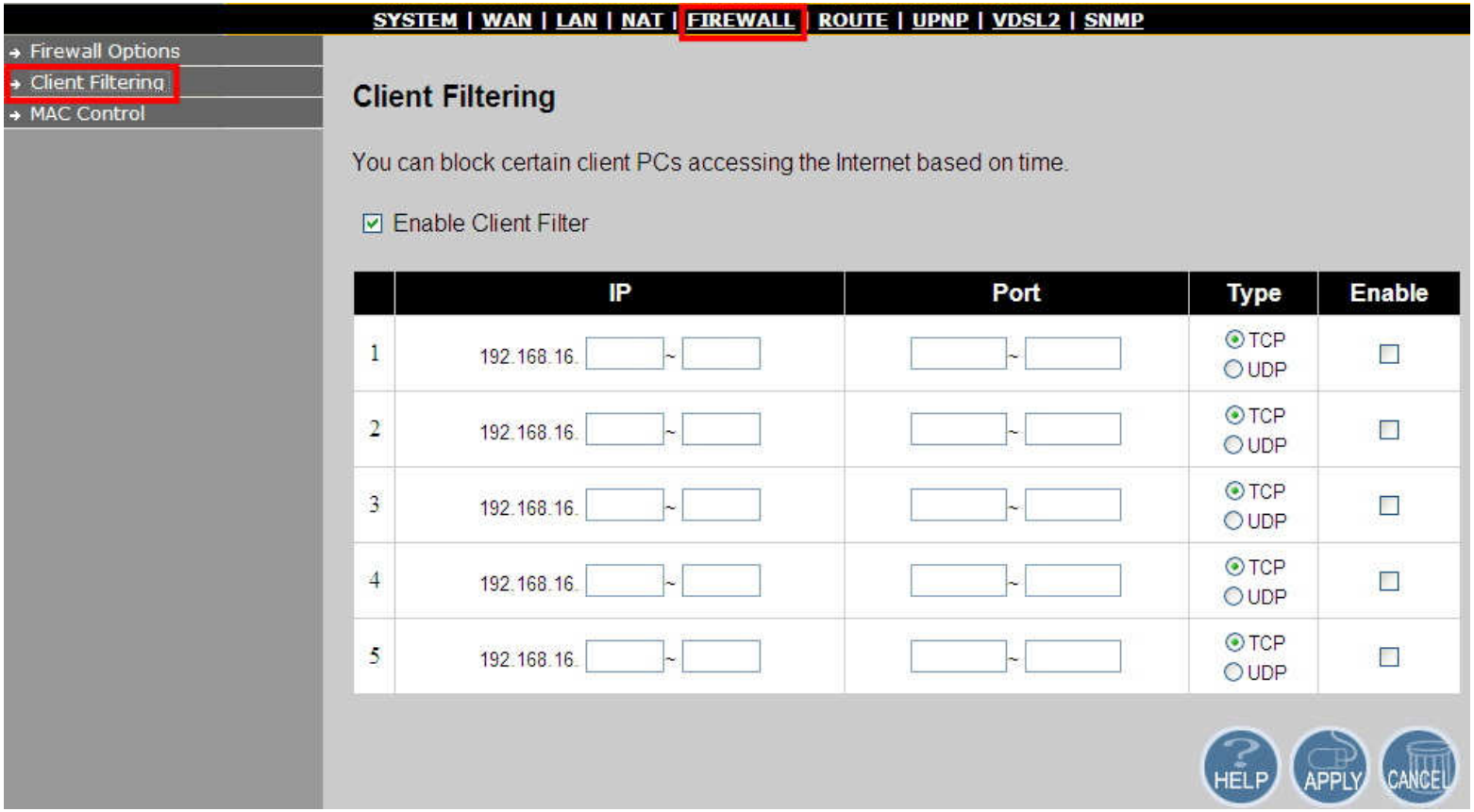


Figure 4.7.2 Client Filter Configuration

The screen contains the following details:

Fields in Client Filter:

Field	Description
Enable Client Filter	Enable or disable the Client Filter feature of VDSL2 CO&CPE ROUTER. Select the check box to enable this option.
IP	Enter the filter IP Address range of the local machines under VDSL2 CO&CPE ROUTER.
Port	Enter the filter Port number range of the local machines under VDSL2 CO&CPE ROUTER.
Type	Select TCP or UDP to filter the protocol type packets from the local machines.
Enable	Provides more IP Addresses of the WAN interface.

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

4.7.3 MAC Control

You can block certain client PCs accessing the Internet based on MAC addresses.

To configure MAC Control, click on the "MAC Control" link in the left navigation bar. A screen is displayed as shown in Figure 4.7.3

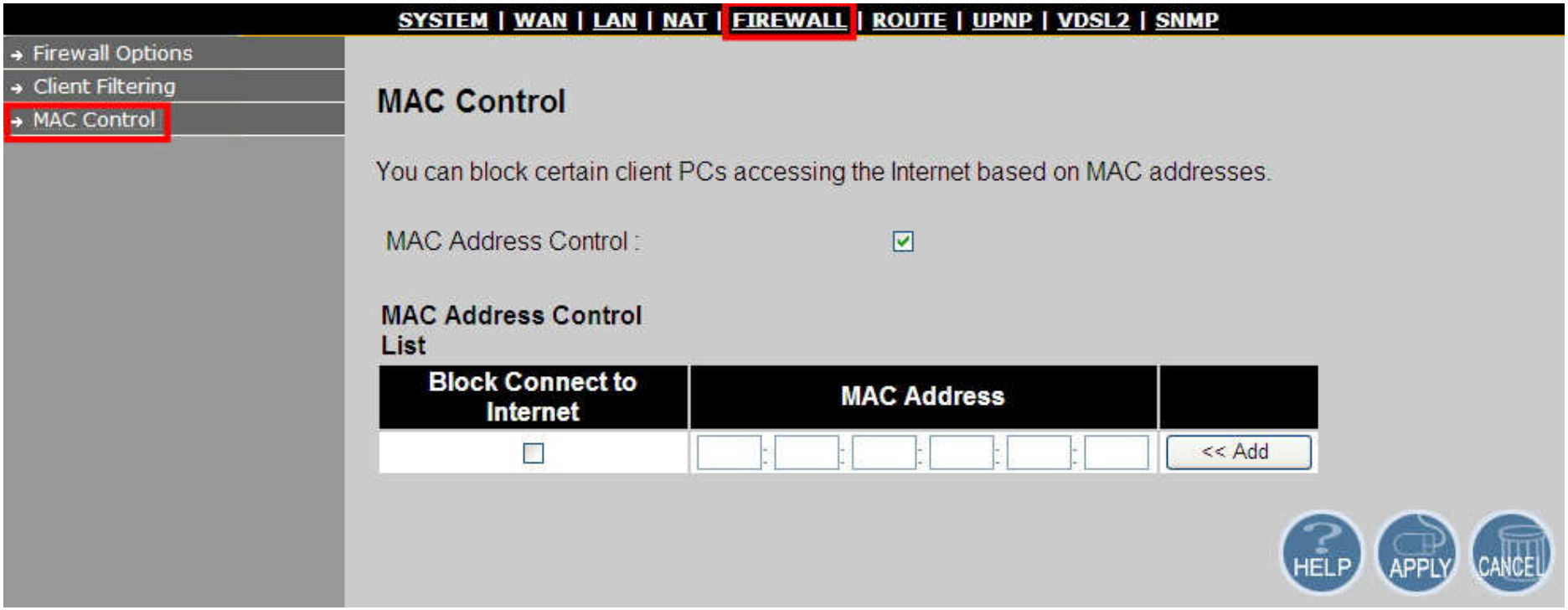

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Firewall Options
Client Filtering
MAC Control
MAC Control
You can block certain client PCs accessing the Internet based on MAC addresses.
MAC Address Control :
MAC Address Control List
Block Connect to Internet
MAC Address
<< Add
HELP
APPLY
CANCEL

Figure 4.7.3 MAC Control Configuration

The screen contains the following details:

Fields in MAC Control:

Field	Description
MAC Address Control	Enable or disable the MAC address control.
Block Connection to Internet	Enable or disable block status. If the check box is selected, it blocks the specified MAC address.
MAC Address	Assign the blocking MAC address for local machine.

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

4.8 Select "Route"

If there are multiple routers installed on your network, it is necessary to configure the VDSL2 router unit's routing functions. Select the "Route". The menu below includes the sub-menus of **Static Routing** and **Routing Table List**. A screen is displayed as shown in Figure 4.8.

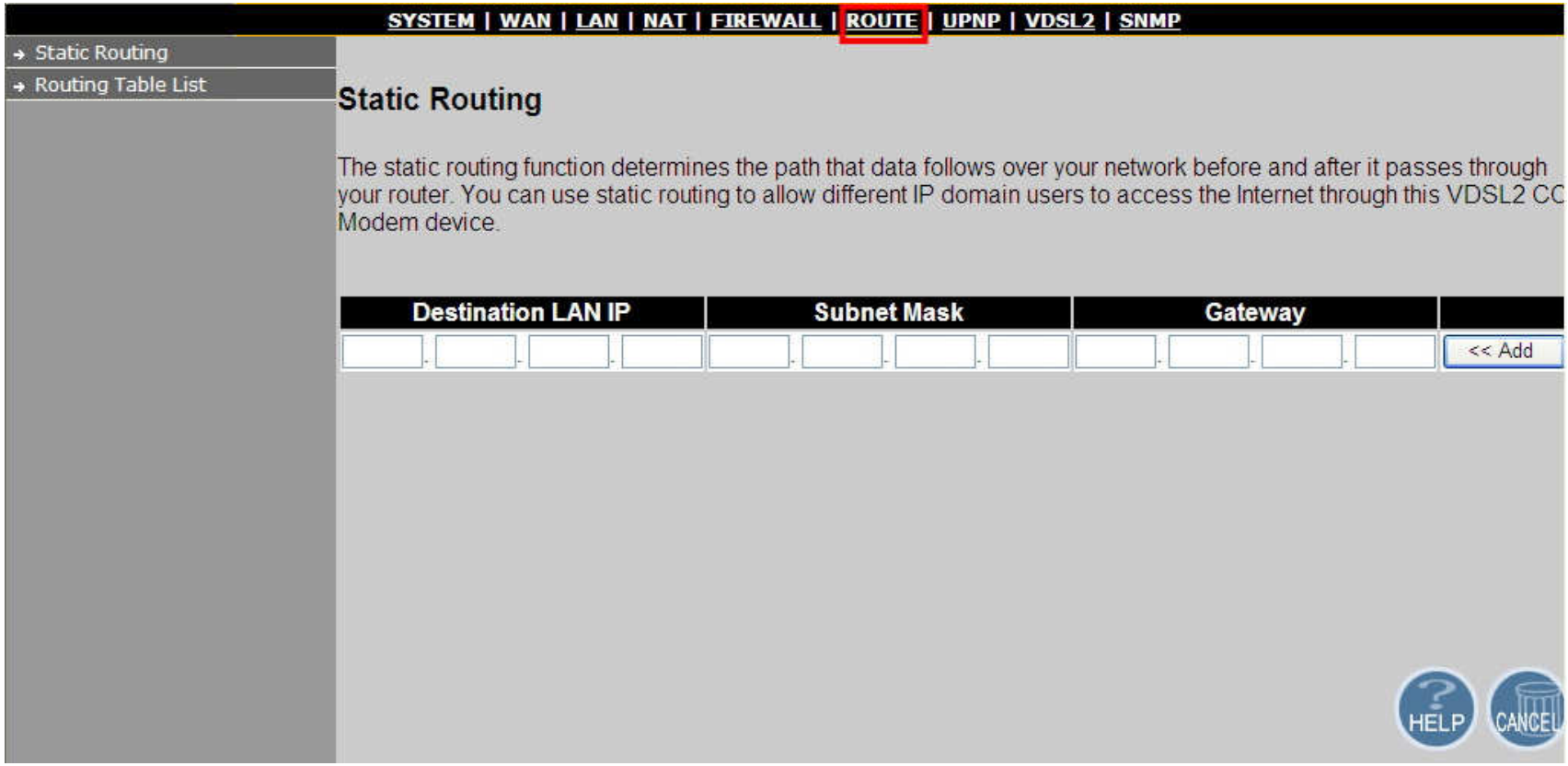

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Static Routing
Routing Table List
Static Routing
The static routing function determines the path that data follows over your network before and after it passes through your router. You can use static routing to allow different IP domain users to access the Internet through this VDSL2 CC Modem device.
Destination LAN IP
Subnet Mask
Gateway
<< Add
HELP
CANCEL

Figure 4.8 Firewall in Left Navigator Bar

4.8.1 Static Routing

The static routing function determines the path that data follows over your network before and after it passes through your router. You can use static routing to allow different IP domain users to access the Internet through this VDSL2 Router device.

To setup Static Routing, click on the "Static Routing" link in the left navigation bar. A screen is displayed as shown in Figure 4.8.1.

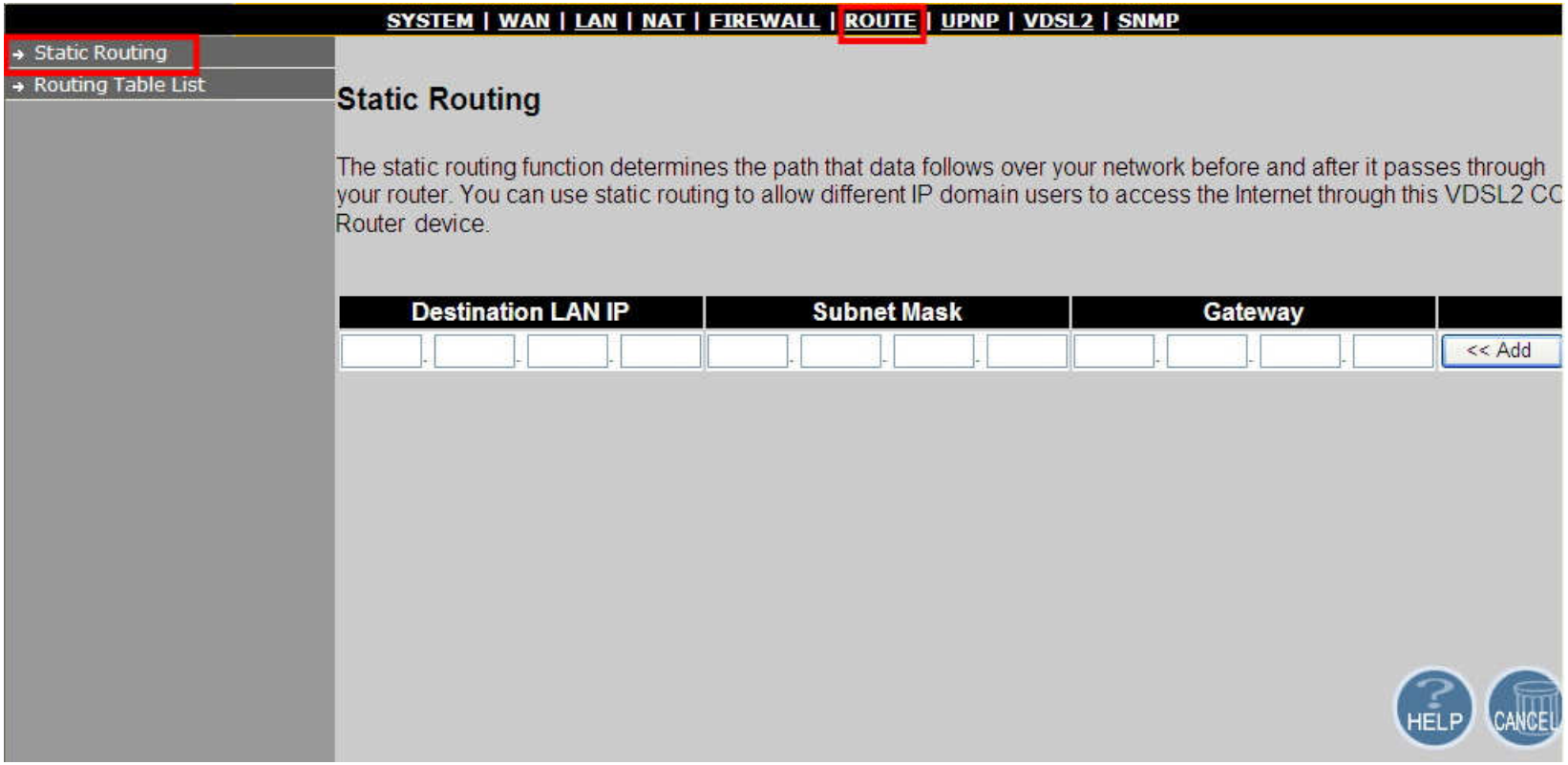

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
Static Routing
Routing Table List
Static Routing
The static routing function determines the path that data follows over your network before and after it passes through your router. You can use static routing to allow different IP domain users to access the Internet through this VDSL2 CC Router device.
Destination LAN IP
Subnet Mask
Gateway
<< Add
HELP
CANCEL

Figure 4.8.1 Static Routing Configuration

The screen contains the following details:

Fields in Static Routing:

Field	Description
Destination LAN IP	Enter the IP Address **0-0-0-0** of routing entry.
Subnet Mask	Enter the Subnet Mask **0-0-0-0** of routing entry.
Gateway	Enter the Gateway address of routing entry.

- Click Add to add the information that has been entered.

Note:

1. Static Routing functionality is used to define the connected Gateway between the LAN and WAN. For example, if we want to activate the Network Time Protocol (NTP) service, and we have to define the Gateway connected to NTP server in the WAN.

2. The gateway of static routing just used for switch(Bridge) mode.

4.8.2 Routing Table List

The Routing table allows you to see how many routings on your VDSL2 router routing table and interface information.

To view the Routing entry table list of NV-600LI/RI, click on the "Routing Table List" link in the left navigation bar. A screen is displayed as shown in Figure 4.8.2.

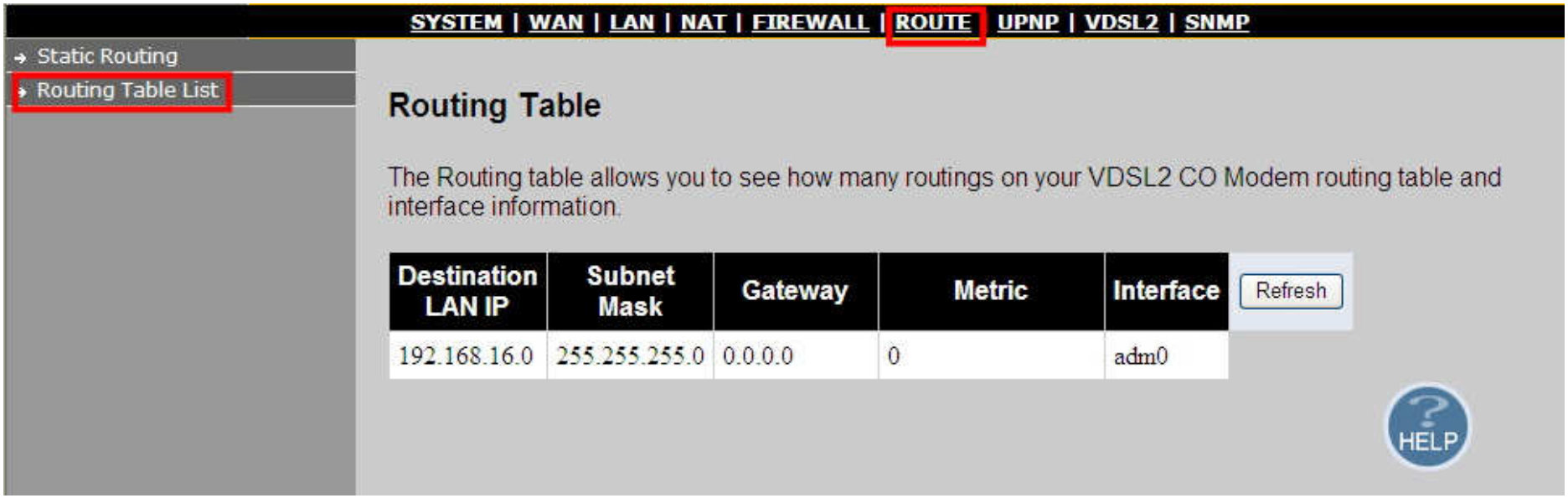


Figure 4.8.2 Routing Table List

The screen contains the following details:

- Click Refresh to update currently routing list of the NV-600LI/RI.

4.9 Select "UPNP"

UPnP is an architecture for pervasive peer-to-peer network connectivity of intelligent appliances, wireless devices, and PCs of all from factors. It is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet. The supports the UPnP Internet Gateway Device for Home Networking. The UPnP Settings can be viewed in the left navigation bar. The following are the options available under UPnP, as shown in Figure 4.9

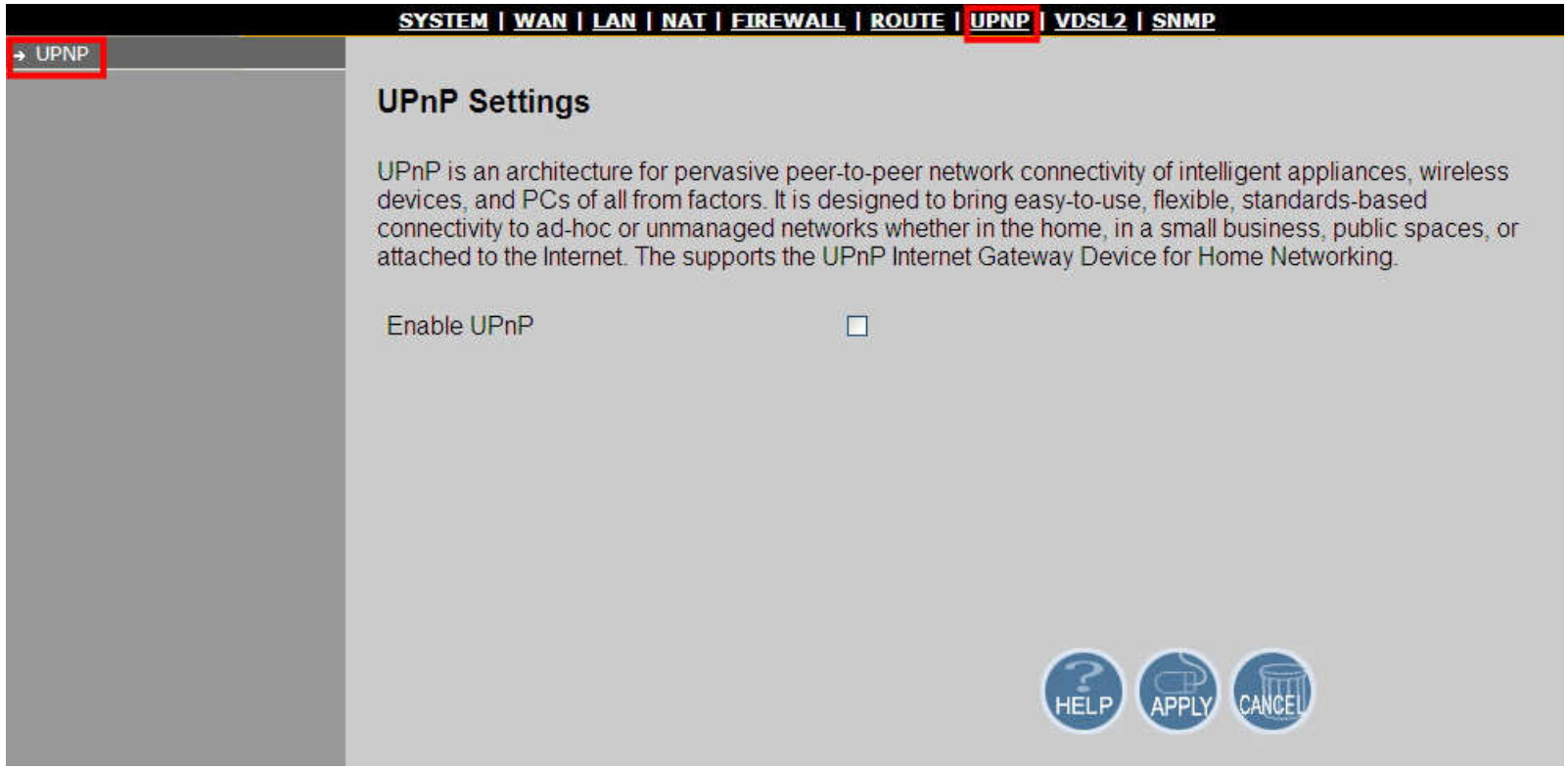

SYSTEM | WAN | LAN | NAT | FIREWALL | ROUTE | UPNP | VDSL2 | SNMP
UPNP
UPnP Settings
UPnP is an architecture for pervasive peer-to-peer network connectivity of intelligent appliances, wireless devices, and PCs of all from factors. It is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet. The supports the UPnP Internet Gateway Device for Home Networking.
Enable UPnP
HELP
APPLY
CANCEL

Figure 4.9 UPNP in Left Navigator Bar

The screen contains the following details:

Fields in UPnP Settings:

Field	Description
Enable UPnP	To enable or disable UPnP Setting. Select the check box to Enable or Disable the UPnP function of SPEED-VDSL2 CO&CPE ROUTER.

- Click APPLY at any time during configuration to save the information that you have entered.
- Click CANCEL to exit from this page without saving the changes.

4.10 Select "SNMP"

The SNMP Settings can be viewed in the left navigation bar. The following are the options available under SNMP, as shown in Figure 4.10

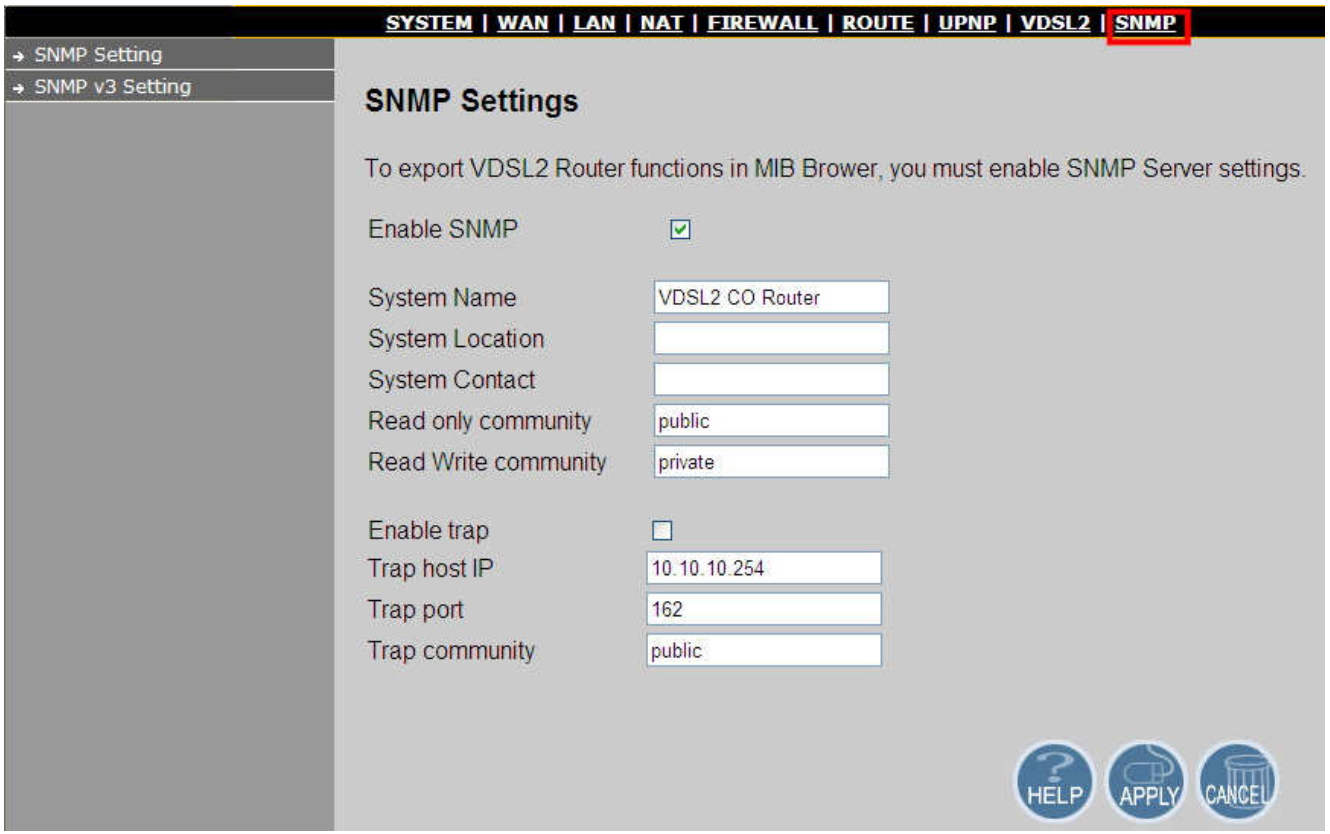


Figure 4.10 SNMP in Left Navigator Bar

4.10.1 SNMP Setting

To enable or disable the SNMP Settings, click on the "SNMP Setting" link in the left navigation bar. A screen is displayed as shown in Figure 4.10.1

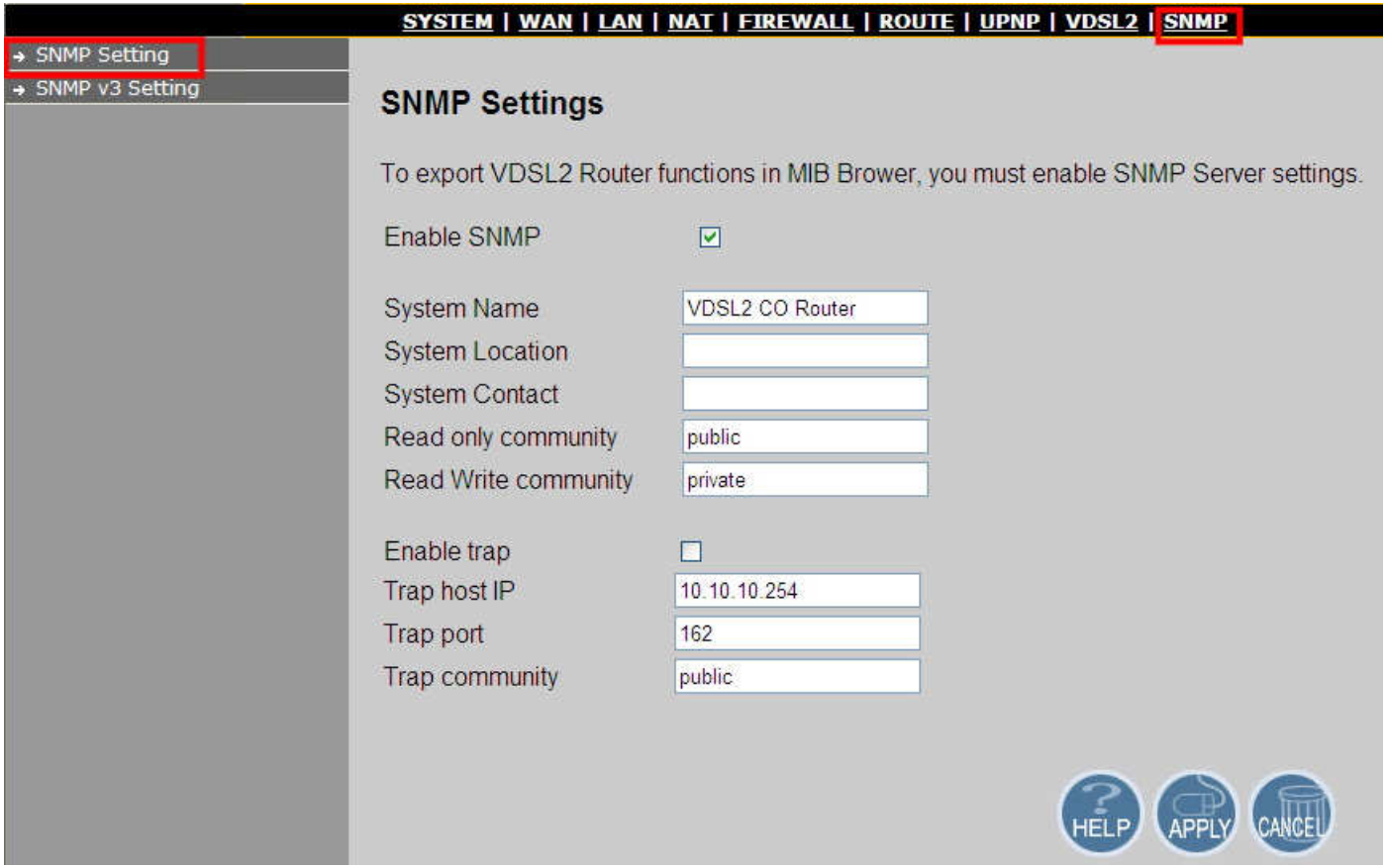


Figure 4.10.1 SNMP Setting

The screen contains the following details:

Fields in SNMP Settings:

Field	Description
Enable SNMP	To enable or disable SNMP Setting. Select the check box to Enable or Disable the SNMP function of NV-600LI/NV-600RI.
System Name	Enter a system name to be used for the VDSL2 Router
System Loaction	Enter the system location of the VDSL2 Modem
System Contact	Enter the name of a person or organization
Read only community	Enables requests accompanied by this string to display MIB-object information. Deafult word is "public".
Read Write community	Enables requests accompanied by this string to display MIB-object information and to set MIB objects. Deafult word is "private".
Enable Trap	To enable or disable Trap Setting. Select the check box to Enable or Disable the Trap function of NV-600LI/NV-600RI.
Trap Host IP	Create a trap manager by entering the IP address.
Trap port	Specifies the trap port. Default trap port is "162".
Trap community	Create a trap manager by entering a community string.

- Click APPLY at any time during configuration to save the information that you have entered.
- Click CANCEL to exit from this page without saving the changes.

4.10.2 SNMPv3 Setting

To enable or disable the SNMPv3 Settings, click on the "SNMPv3 Setup" link in the left navigation bar. A screen is displayed as shown in Figure 4.10.2

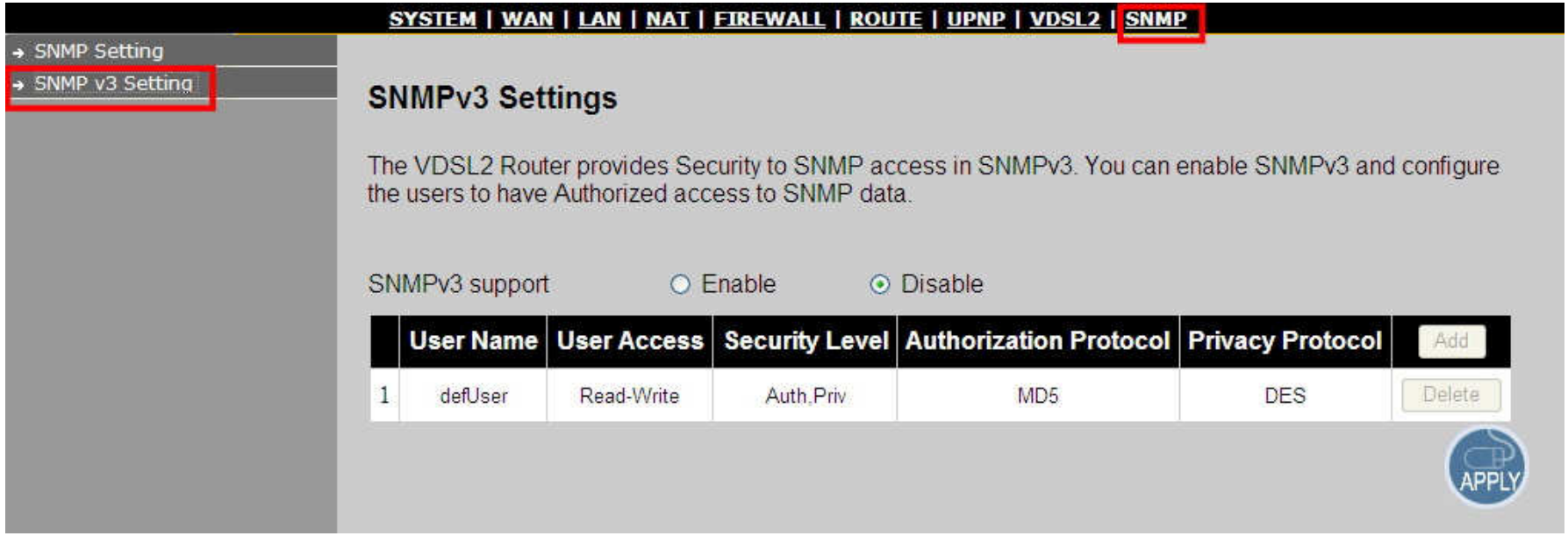


Figure 4.10.2 SNMPv3 Setting(Disable)

The screen contains the following details:

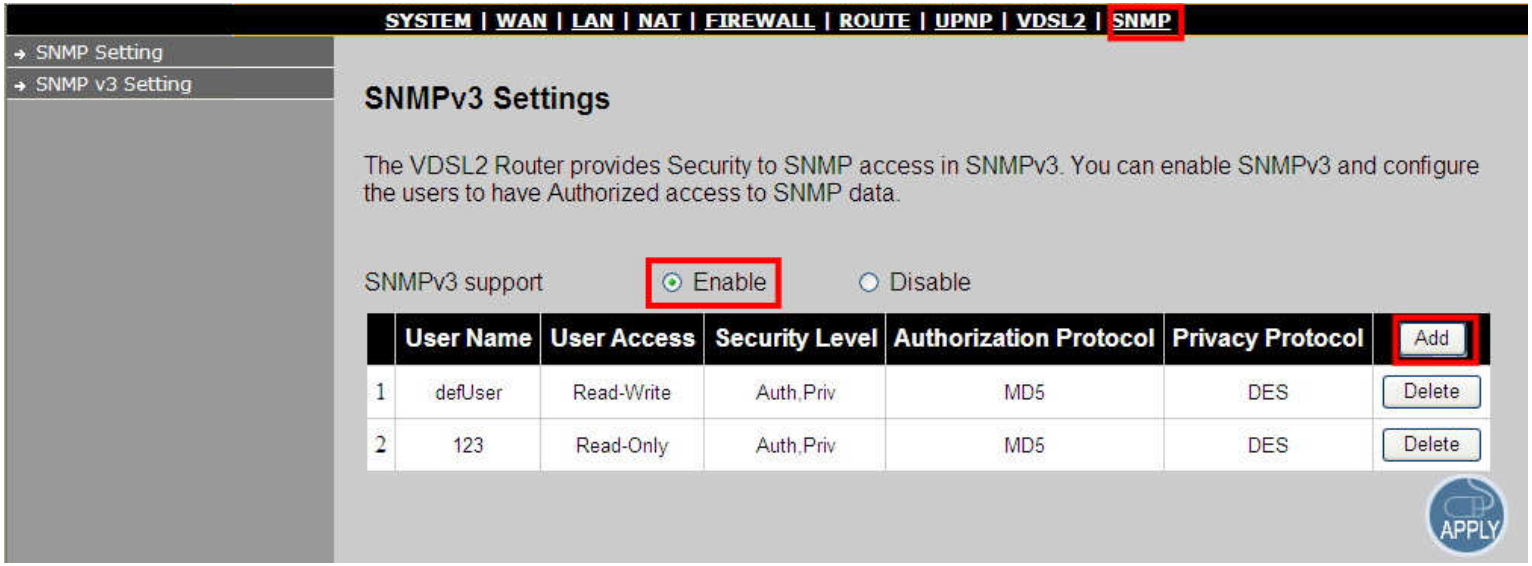


Figure 4.10.2-1 SNMPv3 Setting(Disable)

Fields in SNMPv3 Settings: A screen is displayed as shown in Figure 4.10.2-1.

Field	Description
Enable SNMPv3	To enable or disable SNMP Setting. Select the check box to Enable or Disable the SNMP function of NV-600LS/NV-600RS.
Add	Add a SNMPv3 user
Delete	Delete a SNMPv3 user

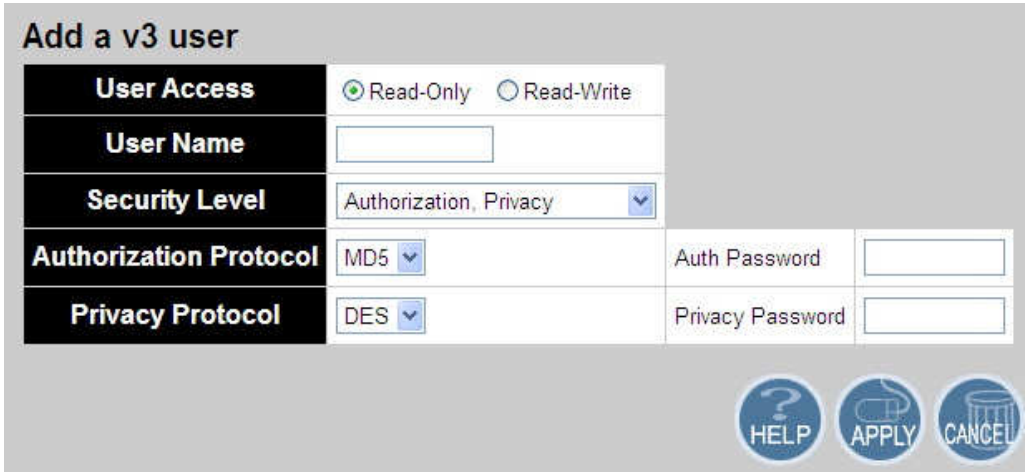


Figure 4.10.2-2 Add a v3 user

Fields in SNMPv3 Add Settings: A screen is displayed as shown in Figure 4.10.2-2.

Field	Description
User Access	Select the check box to Read-Only or Read-Write. Read-Only: Enables requests accompanied by this string to display MIB-object information. Read-Write: Enables requests accompanied by this string to display MIB-object information and to set MIB objects.
User name	Specifies the user name. (1~15 chars)
Security Level	Specifies security level of your need: 1. No Authorization, No Privacy 2. Authorization, No Privacy 3. Authorization, Privacy
Authorization Protocol	Specifies the authorization type. (MD5 / SHA)
Auth Password	Specifies the authorization password. (8~15 chars)
Privacy Protocol	Specifies the privacy type. (DES / AES)
Privacy Password	Specifies the privacy password. (8~15 chars)

Chapter 5. Operating the VDSL2 System

After the VDSL2 system has been set up, one may want to configure the settings that are related to VDSL2. Configuration of operation modes, test modes (loop back) and the display of status information are supported by GUI (Graphical User Interface).

Select the "Route". The menu below includes the sub-menus of **Channel Config**, **Line Config**, **Profile Config**, **LoopBack**, **Activate/Deactivate**, **Line Status**, **Channel Status**, **Version Info**, **SNR Graph** and **Bits Graph**. A screen is displayed as shown in Figure 5-1

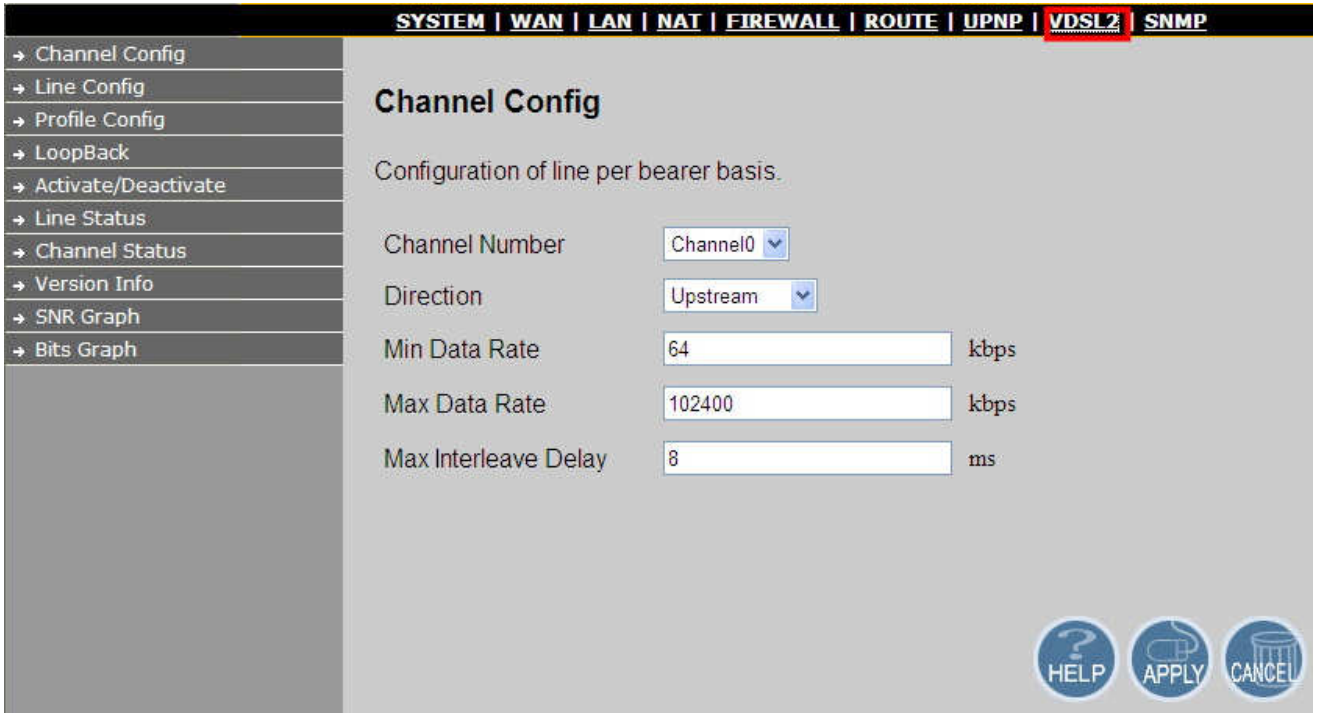


Figure 5-1 VDSL2 in Left Navigator Bar

VDSL2 menu table list:

Section	Item	Description
5-1	**Channel Config**	Configuration of line per bearer basis.
5-2	**Line Config**	Configuration of line.
5-3	**Profile Config**	Configuration of line for specific band plans.
5-4	**Loop Back**	Setting Of Loop Backs.(System - System Loop, or Line Side Loop)
5-5	**Activate Deactivate**	Activating or Deactivating the line
5-6	**Line Status**	Downstream/Upstream SNR status of the Line.
5-7	**Channel Status**	Status of the bearer
5-8	**VDSL2 Version Info**	VDSL2 Version Numbers.
5-9	**SNR Per Tone Graph**	Shown power level in upstream and downstream spectrum, The higher the SNR value, the better the performance.
5-10	**Bits Per Tone Graph**	Shown tone length in upstream and downstream spectrum.

5.1 Select "Channel Config"

To config the VDSL2 channel, click on the "Channel Config" link in the left navigation bar. A screen is displayed as shown in Figure 5.1

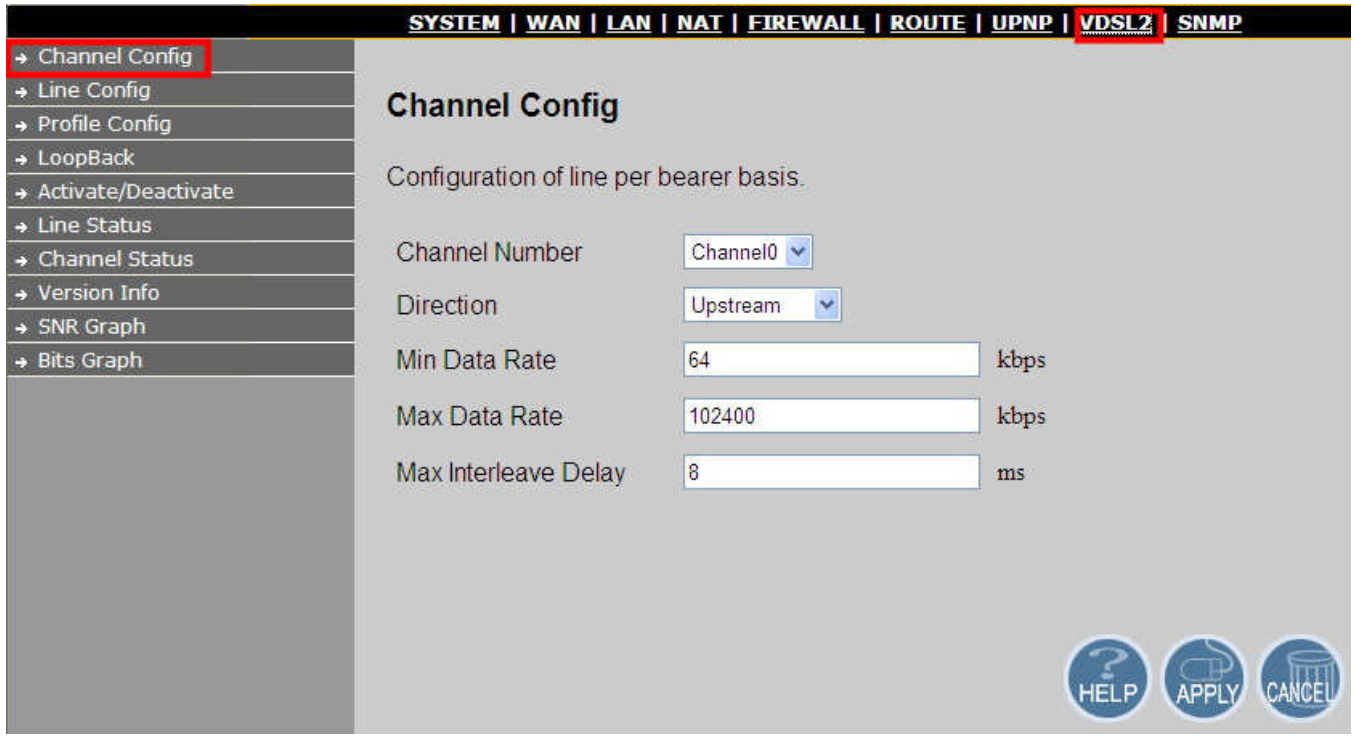


Figure 5.1 Channel Configuration Menu

Channel Configuration Settings:

Setting	Description
Channel Number	To which bearer channel number shall the settings apply? • Channel 0
Direction	To which direction shall the settings apply? • Upstream • Downstream
Min Data Rate	Minimum Payload Data Rate values
Max Data Rate	Maximum Payload Data Rate values
Max Interleave Delay	**Maximum** Interleave Delay values (set from 0 to 255ms)

- Click APPLY at any time during configuration to save the information that you have entered.
- Click CANCEL to exit from this page without saving the changes.

Notes:

1.Regarding the interleave delay value time function for anti-noise purpose, due to the noise of each environment are different, so you could adjust interleave delay value when filed environment has heavy noise. Please note that increase interleave delay time will reduce few vdsl2 bandwidth and depond on interleave delay time.

2. The Min and Max Data Rate function similar rate control function, you can limit rate for the VDSL2 port.

3. Please note you must deactivate then activate once on config port when you config VDSL2 arguments.

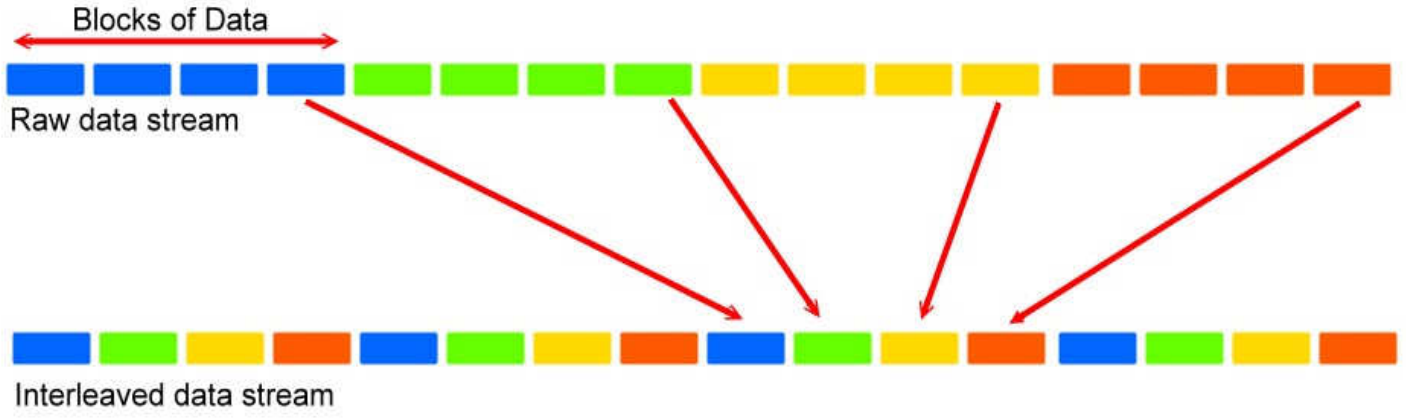
The following description about interleave delay function:

Interleave delay function is used in digital data transmission technology to protect the transmission against noise issue and data error.

If during transit more than a certain amount of data has been lost then the data cannot be correctly decoded. Short bursts of noise on the line can cause these data packets to become corrupt and the router has to re-request data which in turn can slow down the overall rate at which data is transmitted.

Interleaving is a method of taking data packets, chopping them up into smaller bits and then rearranging them so that once contiguous data is now spaced further apart into a non continuous stream. Data packets are re-assembled by your router.

The diagram below is an example of how interleaved traffic is transmitted.



If your line is particularly susceptible to bursts of noise then interleaving should improve your VDSL2 experience simply because if you lose a whole batch of data then this could cause your router to loose sync with the exchange.

Using Interleaving, the router is able to re-assemble the data or if necessary just re-request the part of the data that it is unable to recover. By increasing the interleave depth of each ports that are susceptible to noise, this will improve error performance and stability of marginal lines.

5.2 Select "Line Config"

To config the Line, click on the "Line Config" link in the left navigation bar. A screen is displayed as shown in Figure 5.2

Figure 5.2 Line Configuration Menu for SNR Margin Selection

Line Configuration Settings:

Setting	Description
Direction	Select the target direction.
Target SNRM	Set the required SNR Margin *10 (**60=6dB**)

Note:

Noise Margin is the non-technical term for Signal to Noise Ratio Margin (SNRM). Domestic standard modems and VDSL2 routers often use the terms Noise Margin or SNR when reporting on its value. The Signal to Noise Ratio, as its name implies, is the ratio between the strength of the signal and the level of noise on the line.

That ratio is a major factor in determining the connection speed, as the higher the ratio the higher the possible speed. The SNRM is a margin which by which the noise level can rise before connection is lost.

Taking the default (target) value of 6 dB applied is follow up telecom standard. Basically, you don't need adjust this value.

5.3 Select "Profile Config"

For this function, NV-600LI/RI provides world wide telecom standard band plan, such as meet European telecom standard band plan 998(17a), USA telecom standard band plan 997(8a, 8b) and APAC Telecom standard band plan (30a) etc.

- **Annex A** specifies bandplans for the North American region and enables NV-600 to be deployed with traditional POTS telephony or in an all-digital mode.
- **Annex B** specifies bandplans for Europe and enables NV-600 deployment with underlying POTS and ISDN services.
- **Annex C** allows NV-600 to coexist with TCM-ISDN services, found primarily in APAC.

NV-600 has numerous configuration profiles and bandplans to meet regional service provider requirements. The frequency bandwidth has increased to 30 MHz, with configuration options at 8.5 MHz, 12 MHz, 17.7 MHz and 30 MHz.

Band profile and band plan can only be configured at NV-600L as NV-600R will auto-follow up on the settings of NV-600L. The only thing that NV-600R must be configured so that the routers will link is the tone mode. However, the default tone mode for NV-600LI/RI is V43, so at default there's no need to change the tone mode unless it is required by the telecom companies to use different tone mode. Another important thing is that band profile and band plan setting must be compatible to each other if not access error will show when applied. Please deactivate and activate once the setting has been changed.

To config the Profile, click on the "Profile Config" link in the left navigation bar. A screen is displayed as shown in Figure 5.3.1 & 5.3.2

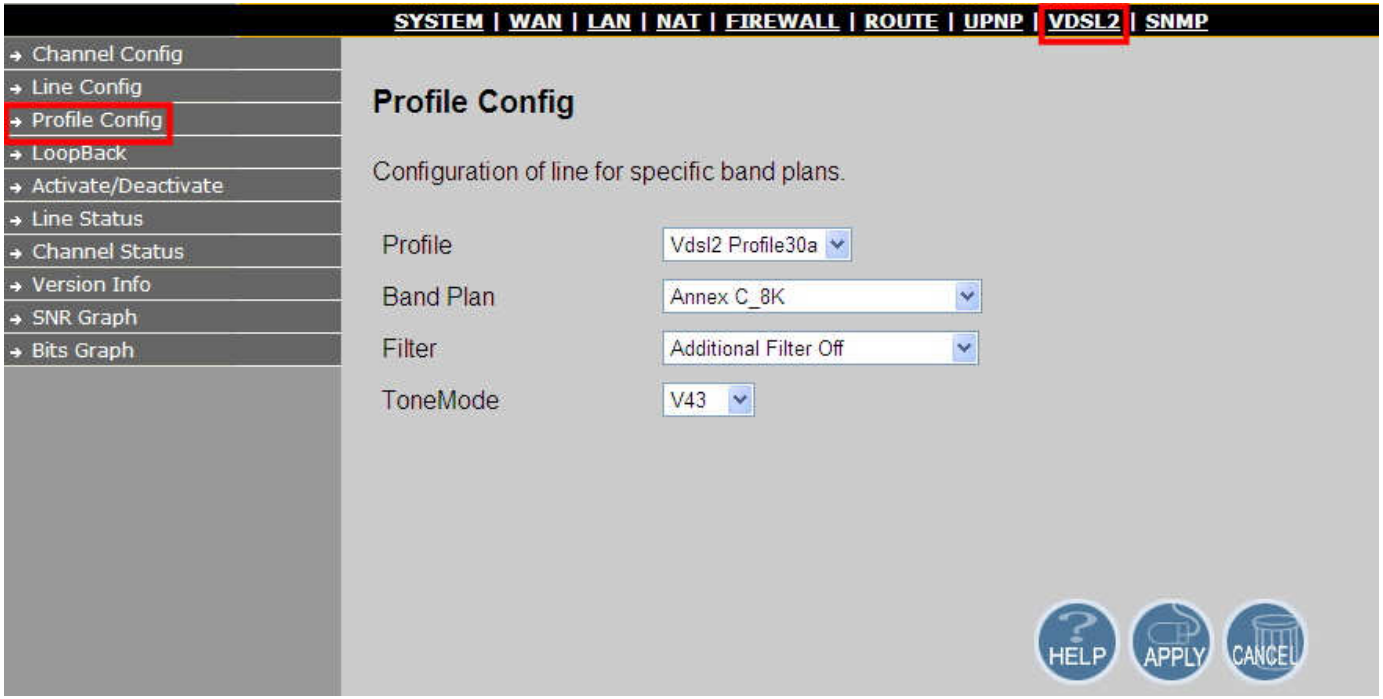


Figure 5.3.1 NV-600LI Profile Configuration

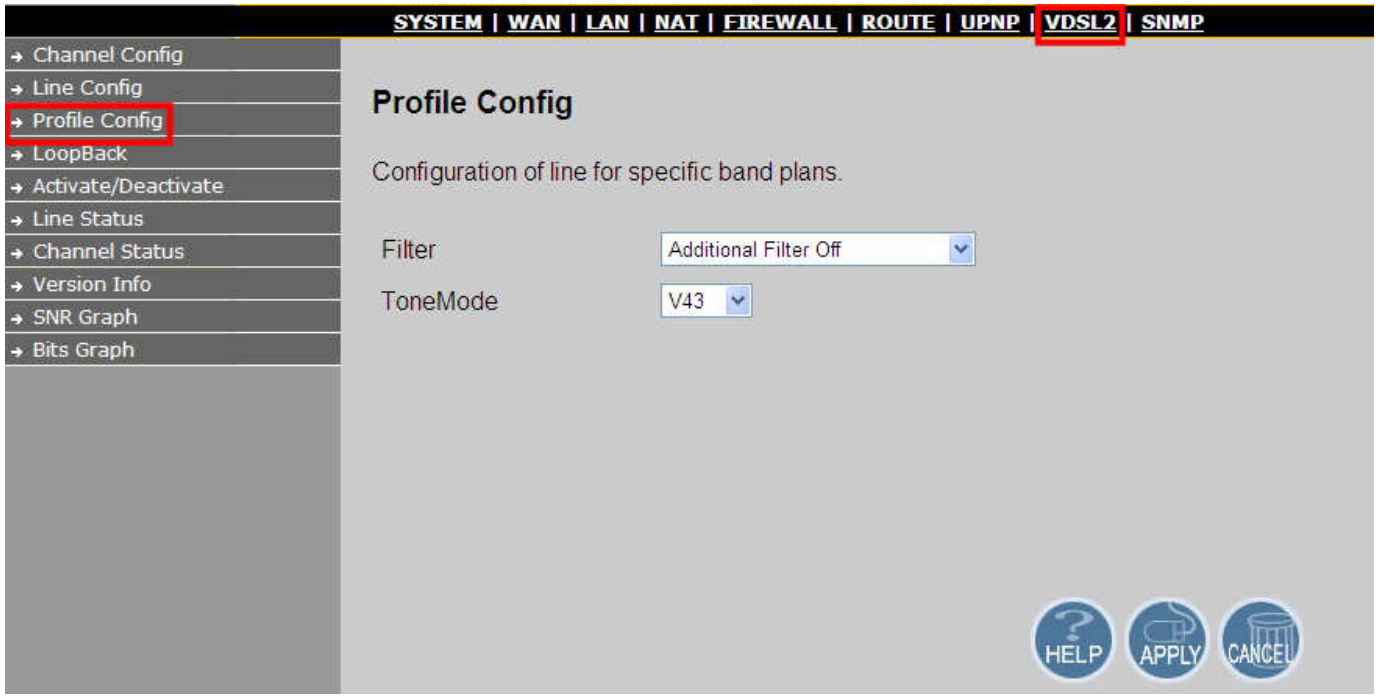


Figure 5.3.2 NV-600RI Profile Configuration

- Click APPLY at any time during configuration to save the information that you have entered.
- Click CANCEL to exit from this page without saving the changes.

Note:

Filter and Tone Mode of NV-600LI and NV-600RI need to match.
(Factory Default for Filter is Off, for Tone Mode is V43)

Figure 5.3.3 Band Profile and Plan Setup Error

Profile Region	8a US	8b EU	8c US	8d all	12a all	12b all	17a EU/US	30a APAC
Bandwidth (MHz)	8.832	8.832	8.500	8.832	12.000	12.000	17.664	30.000
Tones	2047	2047	1971	2047	2782	2782	4095	3478
Tone Spacing (kHz)	4.3125	4.3125	4.3125	4.3125	4.3125	4.3125	4.3125	8.625
Line Power (dBm)	+17.5	+20.5	+11.5	+14.5	+14.5	+14.5	+14.5	+14.5
Netsys(Infineon)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Competitor A	No	No	Yes	Yes	?	Yes	No	No
Competitor B	Yes	No	Yes	Yes	Yes	Yes	CO only	No

Figure 7.1.3.4 Band Profile Region

The following shows the band profile and band plan compatibility:

	Band Profile List		Band Plan List
0	VDSL2 Profile8a	0	Annex A M1_EU32
1	VDSL2 Profile8b	1	Annex A M9_EU64
2	VDSL2 Profile8c	8	Annex B 997-M2x-A (B05)
3	VDSL2 Profile8d	9	Annex B 997-M2x-M (B06)
4	VDSL2 Profile12a	10	Annex B 997-M1c-A-7 (B07)
5	VDSL2 Profile12b	11	Annex B 998-M1x-B (B08)
6	VDSL2 Profile17a	13	Annex B 998-M2x-A (B10)
7	VDSL2 Profile30a	14	Annex B 998-M2x-M (B11)
8	VDSL2 Profile17b	16	Annex B 998-M2x-B (B12)
		18	Annex B 998-M2x-NUS0 (B13)
		20	Annex C
		21	Annex C_8K
		22	Annex B 997-M2x-NUS0
		23	Annex C 1M1
		24	Annex C_8K 1M1
		25	Annex B 998E17-M2x-A
		26	Annex B 998E17-M2x-NUS0

Band Profile \ Band Plan	0	1	8	9	10	11	13	14	16	18	20	21	22	23	24	25	26
0	O	O	O	O	O	O	O	O	O	X	X	X	X	X	X	X	X
1	O	O	O	O	O	O	O	O	O	X	X	X	X	X	X	X	X
2	X	X	O	X	O	X	X	O	X	X	X	X	X	X	X	X	X
3	O	O	O	X	O	O	O	O	O	X	X	X	X	X	X	X	X
4	O	O	O	O	O	O	O	O	O	X	X	X	X	X	X	X	X
5	O	O	X	X	O	O	O	O	O	O	X	X	X	X	X	X	X
6	O	X	X	X	O	O	O	O	O	X	O	X	X	O	X	X	O
7	O	X	X	X	X	X	X	X	X	X	X	O	O	X	O	X	X
8	X	X	X	X	X	X	X	O	O	X	X	X	X	X	X	O	X

Note: O = Compatible; X = Not Compatible

Tip:

Downstream: Traffic from Transmitter to Receiver

Upstream: Traffic from Receiver to Transmitter

Following examples for band profile and band plan combination, you can find minimum distance and maximum distance relationship.

★ Please note that the following data represents test result in a lab environment and are for reference only, the actual data rate will vary on the quality of the copper wire and environment factors.

Band Porfile	Band Plan	Minimum Distance			Maximum Distance		
		Distance	Upstream	Downstream	Distance	Upstream	Downstream
8a	Annex A M1_EU32	100 m	4.5 Mbps	84.2 Mbps	2100 m	0.1 Mbps	18.9 Mbps
8a	Annex A M9_EU64	100 m	6.8 Mbps	83.3 Mbps	2100 m	0.7 Mbps	11.6 Mbps
8a	Annex B 997 M2x-A (B05)	100 m	23.1 Mbps	56.7 Mbps	2000 m	0.1 Mbps	19 Mbps
8a	Annex B 997 M2x-M (B06)	100 m	26.2 Mbps	56.6 Mbps	2200 m	0.5 Mbps	9.3 Mbps
8a	Annex B 997 M1c-A-7 (B07)	100 m	5.5 Mbps	75.8 Mbps	2000 m	0.1 Mbps	19 Mbps
8a	Annex B 998 M1x-B (B08)	100 m	7 Mbps	75.3 Mbps	2100 m	0.5 Mbps	11.9 Mbps
8a	Annex B 998 M2x-A (B10)	100 m	4.9 Mbps	80.4 Mbps	2100 m	0.1 Mbps	19.5 Mbps
8a	Annex B 998 M2x-M (B11)	100 m	7 Mbps	81.8 Mbps	2100 m	0.8 Mbps	12 Mbps
8a	Annex B 998 M2x-B (B12)	100 m	6.8 Mbps	81.7 Mbps	2200 m	0.5 Mbps	10.2 Mbps
8b	Annex A M1_EU32	100 m	5.1 Mbps	82.6 Mbps	1700 m	0.1 Mbps	25.1 Mbps
8b	Annex A M9_EU64	100 m	7.4 Mbps	85.1 Mbps	2100 m	0.5 Mbps	12.2 Mbps
8b	Annex B 997 M2x-A (B05)	100 m	21.5 Mbps	58.4 Mbps	1400 m	1.9 Mbps	24.4 Mbps
8b	Annex B 997 M2x-M (B06)	100 m	27.8 Mbps	58.2 Mbps	2100 m	0.5 Mbps	11.9 Mbps
8b	Annex B 997 M1c-A-7 (B07)	100 m	7.2 Mbps	84.8 Mbps	1700 m	0.1 Mbps	23 Mbps
8b	Annex B 998 M1x-B (B08)	100 m	8.5 Mbps	85.8 Mbps	2100 m	0.3 Mbps	11.7 Mbps

Band Porfile	Band Plan	Minimum Distance			Maximum Distance		
		Distance	Upstream	Downstream	Distance	Upstream	Downstream
8b	Annex B 998 M2x-A (B10)	100 m	6.8 Mbps	85 Mbps	1800 m	0.1 Mbps	23.7 Mbps
8b	Annex B 998 M2x-M (B11)	100 m	7.7 Mbps	84.5 Mbps	2100 m	0.5 Mbps	12.4 Mbps
8b	Annex B 998 M2x-B (B12)	100 m	7.6 Mbps	84 Mbps	2100 m	0.3 Mbps	12.7 Mbps
8c	Annex B 997 M2x-A (B05)	100 m	13 Mbps	60 Mbps	2100 m	0.2 Mbps	14.6 Mbps
8c	Annex B 997 M1c-A-7 (B07)	100 m	7.4 Mbps	84.7 Mbps	2100 m	0.2 Mbps	14.9 Mbps
8c	Annex B 998 M2x-M (B11)	100 m	8.5 Mbps	86.2 Mbps	2100 m	1 Mbps	5.8 Mbps
8d	Annex A M1_EU32	100 m	6.5 Mbps	86.6 Mbps	2100 m	0.2 Mbps	16.2 Mbps
8d	Annex A M9_EU64	100 m	7.5 Mbps	85.5 Mbps	2100 m	0.9 Mbps	8.3 Mbps
8d	Annex B 997 M2x-A (B05)	100 m	26.8 Mbps	58.4 Mbps	2100 m	0.1 Mbps	17.9 Mbps
8d	Annex B 997 M1c-A-7 (B07)	100 m	6.6 Mbps	80.1 Mbps	2100 m	0.1 Mbps	16.7 Mbps
8d	Annex B 998 M1x-B (B08)	100 m	7.7 Mbps	79.8 Mbps	2100 m	0.7 Mbps	10.2 Mbps
8d	Annex B 998 M2x-A (B10)	100 m	6.4 Mbps	84.4 Mbps	2100 m	0.2 Mbps	17.5 Mbps
8d	Annex B 998 M2x-M (B11)	100 m	7.6 Mbps	83.9 Mbps	2100 m	1 Mbps	9.2 Mbps
8d	Annex B 998 M2x-B (B12)	100 m	7.3 Mbps	84 Mbps	2100 m	0.7 Mbps	10 Mbps
12a	Annex A M1_EU32	100 m	26.7 Mbps	88.4 Mbps	2000 m	0.1 Mbps	12.4 Mbps
12a	Annex A M9_EU64	100 m	32.6 Mbps	87.8 Mbps	2000 m	0.8 Mbps	7.8 Mbps
12a	Annex B 997 M2x-A (B05)	100 m	48.5 Mbps	59.2 Mbps	2000 m	0.1 Mbps	14.8 Mbps

Band Porfile	Band Plan	Minimum Distance			Maximum Distance		
		Distance	Upstream	Downstream	Distance	Upstream	Downstream
12a	Annex B 997 M2x-M (B06)	100 m	51.9 Mbps	58.6 Mbps	2000 m	0.8 Mbps	8.1 Mbps
12a	Annex B 997 M1c-A-7 (B07)	100 m	33 Mbps	82.5 Mbps	2000 m	0.1 Mbps	18.6 Mbps
12a	Annex B 998 M1x-B (B08)	100 m	33.6 Mbps	81.9 Mbps	1900 m	0.7 Mbps	13.9 Mbps
12a	Annex B 998 M2x-A (B10)	100 m	28.7 Mbps	85.9 Mbps	2000 m	0.1 Mbps	14.8 Mbps
12a	Annex B 998 M2x-M (B11)	100 m	32.5 Mbps	85.6 Mbps	2100 m	0.8 Mbps	0.7 Mbps
12a	Annex B 998 M2x-B (B12)	100 m	32.6 Mbps	85.6 Mbps	2000 m	0.7 Mbps	9.8 Mbps
12b	Annex A M1_EU32	100 m	31.9 Mbps	88.4 Mbps	1500 m	1.1 Mbps	31 Mbps
12b	Annex A M9_EU64	100 m	31.9 Mbps	87.9 Mbps	1500 m	1.3 Mbps	31 Mbps
12b	Annex B 997 M1c-A-7 (B07)	100 m	33 Mbps	82.5 Mbps	1400 m	0.9 Mbps	32.7 Mbps
12b	Annex B 998 M1x-B (B08)	100 m	33.5 Mbps	81.8 Mbps	1400 m	1 Mbps	31.4 Mbps
12b	Annex B 998 M2x-A (B10)	100 m	32.2 Mbps	85.6 Mbps	1400 m	1.3 Mbps	34.7 Mbps
12b	Annex B 998 M2x-M (B11)	100 m	32 Mbps	85.9 Mbps	1400 m	0.8 Mbps	33.8 Mbps
12b	Annex B 998 M2x-B (B12)	100 m	32.1 Mbps	85.9 Mbps	1400 m	0.7 Mbps	33.7 Mbps
12b	Annex B 998-M2x-NUS0(B13)	100 m	31.9 Mbps	85.9 Mbps	1400 m	0.7 Mbps	33.5 Mbps
17a	Annex A M1_EU32	100 m	28.6 Mbps	100 Mbps	1400 m	1.7 Mbps	31.1 Mbps
17a	Annex B 997 M1c-A-7 (B07)	100 m	29.4 Mbps	100 Mbps	1300 m	1.1 Mbps	34.2 Mbps
17a	Annex B 998 M1x-B (B08)	100 m	29 Mbps	100 Mbps	1300 m	1.4 Mbps	34.6 Mbps
17a	Annex B 998 M2x-A (B10)	100 m	28.4 Mbps	100 Mbps	1400 m	1.1 Mbps	34.5 Mbps

Band Porfile	Band Plan	Minimum Distance			Maximum Distance		
		Distance	Upstream	Downstream	Distance	Upstream	Downstream
17a	Annex B 998 M2x-M (B11)	100 m	28.5 Mbps	100 Mbps	1400 m	1 Mbps	34.2 Mbps
17a	Annex B 998 M2x-B (B12)	100 m	28.3 Mbps	100 Mbps	1400 m	0.5 Mbps	33.4 Mbps
17a	Annex C	100 m	31.2 Mbps	100 Mbps	1300 m	2.2 Mbps	28.6 Mbps
17a	Annex C 1M1	100 m	32.3 Mbps	100 Mbps	1300 m	1 Mbps	22.7 Mbps
17a	Annex B 998E17-M2x-NUS0	100 m	38.3 Mbps	100 Mbps	1300 m	1.3 Mbps	35.4 Mbps
17b	Annex B 998 M2x-M (B11)	100 m	29.4 Mbps	100 Mbps	2000 m	0.9 Mbps	8.1 Mbps
17b	Annex B 998 M2x-B (B12)	100 m	28.9 Mbps	100 Mbps	2000 m	0.7 Mbps	8.3 Mbps
17b	Annex B 998E17-M2x-A	100 m	37.3 Mbps	100 Mbps	2000 m	0.1 Mbps	13.6 Mbps
30a	Annex A M1_EU32	100 m	77.2 Mbps	100 Mbps	1400 m	1.6 Mbps	30 Mbps
30a	Annex C_8K	100 m	100 Mbps	100 Mbps	1300 m	2.4 Mbps	25.5Mbps
30a	Annex B 998E17-M2x-NUS0	100 m	100 Mbps	100 Mbps	200 m	80.8Mbps	100 Mbps
30a	Annex C 8K_1M1	100 m	100 Mbps	100 Mbps	1300 m	2.8 Mbps	21.8 Mbps

5.4 Select "Loop Back"

Loopback (loop-back) describes ways of routing electronic signals, digital data streams, or flows of items from their originating facility back to the source without intentional processing or modification. This is primarily a means of testing the transmission or transportation infrastructure.

The loop back testing function for checking phone wire link problem: 1. System Loop. 2. Line Side Loop

To config the Loop Back, click on the "Loop Back" link in the left navigation bar. A screen is displayed as shown in Figure 5.4

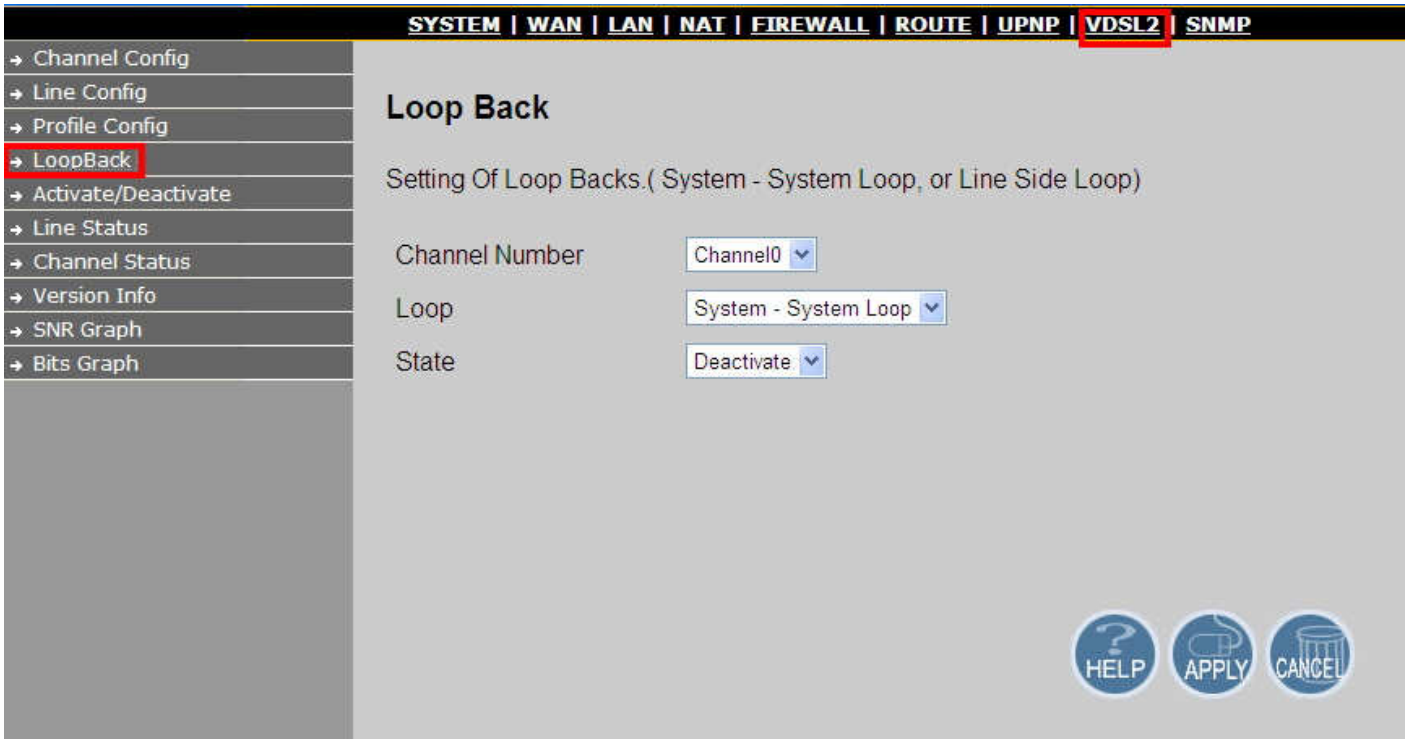


Figure 7.1.4 Loop Back Activation/Deactivation Menu

The screen contains the following details:

Loop Back

Setting	Description
Channel No.	To which bearer channel number shall the settings apply? Channel 0
Loop	System loop or line side loop
State	Activate or deactivate loop back within the transmission convergence layer

- Click APPLY at any time during configuration to save the information that you have entered.
- Click CANCEL to exit from this page without saving the changes.

Example applications(**Reference only**):

- Performing transmission tests of access lines from the serving switching center, which usually does not require the assistance of personnel at the served terminal.
- Testing between stations (not necessarily adjacent) where in two lines are used, with the test being done at one station and the two lines interconnected at the distant station. Commonly called loop around when the interconnecting circuit is accessed by dialing.
- A patch cable, applied manually or automatically, remotely or locally, that facilitates a loop-back test.
- A communication channel with only one endpoint. Any message transmitted through such a channel is immediately received by the same channel.

5.5 Select "Activate Deactivate"

This function is for enable/disable VDSL2 port. A screen is displayed as shown in Figure 5.5

Figure 5.5 Activation and Deactivation of the Line

Line Activation/Deactivation:

Setting	Description
Line	Activate or deactivate the line. (Select the activity and the press the APPLY button.)

- Click APPLY at any time during configuration to save the information that you have entered.
- Click CANCEL to exit from this page without saving the changes.

Note:

Please note you must deactivate then activate once on config port when you adjust VDSL2 function.

5.6 Select "Line Status"

This function provides SNR value for checking phone wiring quality. A screen is displayed as shown in Figure 5.6

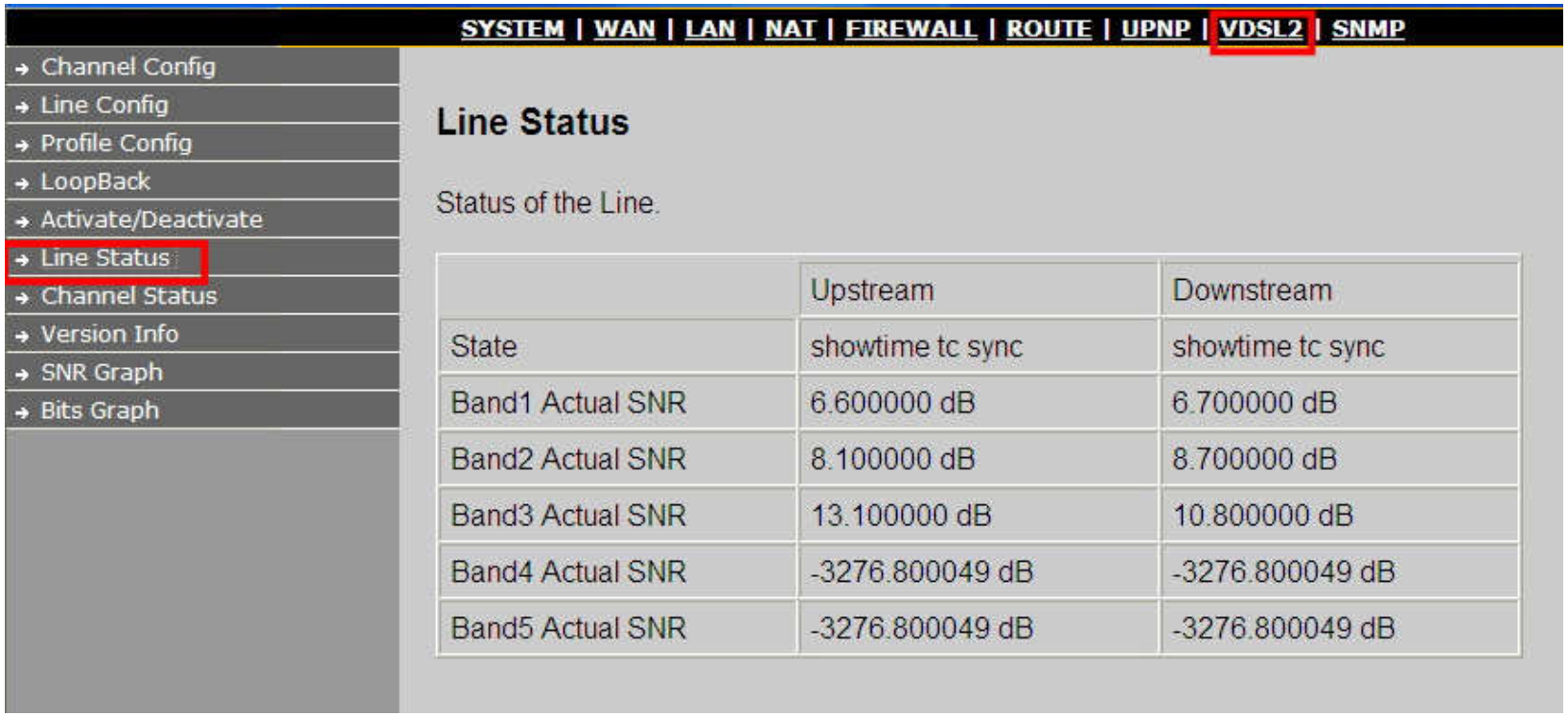


Figure 5.6 Line Status Display: Actual SNR

Note:

Band Actual SNR value, if the value is 0 dB, currently dose not transmit; if the value is negative, do not currently use.
For example, the above screen display Band1 to Band3 value of 30A mode state.

The following status messages may occur(Reference only):

Line Status	Description	Line Status	Description
not_initialized	Line Status is not initialized!	**exchange**	EXCHANGE for VDSL2 this is a substate of FULL_INIT and is not reported.
exception	EXCEPTION corresponds to the VDSL2 device state FAIL_STATE.	**showtime no sync**	SHOWTIME corresponds to VDSL2 device state STEADY STATE TC NO SYNC.
idle request	Interim state between deactivation of line and the time this user request is acknowledged by the firmware.	**showtime tc sync**	SHOWTIME TC SYNC corresponds to VDSL2 device state STEADY STATE TC SYNC.
Idle	corresponds to the GEMINAX device state DISABLED and the VDSL2 device state RESET STATE SOCRATES device state DOWN READY.	**fast retrain**	FASTRETRAIN not supported by VDSL2.
silent request	Interim state between activation of line and the time this user request is acknowledged by the firmware.	**lowpower l2**	LOWPOWER_L2 not supported by VDSL2.
Silent	corresponds to the GEMINAX device state IDLE and the VDSL2 device state READY.	**loopdiagnostic**	DIAGNOSTIC ACTIVE.
handshake	HANDSHAKE corresponds to VDSL2 device state GHS.	**loopdiagnostic**	DIAGNOSTIC DATA EXCHANGE.
full init	FULL INIT GEMINAX device does not support this state corresponds to VDSL2	**complete**	Test status is complete.

	device state FULL INIT.		
discovery	DISCOVERY for VDSL2 this is a substate of FULL INIT and is not reported.	**resync, test**	Resync test status
Training	TRAINING for VDSL2 this is a substate of FULL INIT and is not reported.	**lowpower l3**	LOWPOWER L3 not supported by VDSL2.
analysis	ANALYSIS for VDSL2 this is a substate of FULL INIT and is not reported.	**unknown**	All line states that are not assigned at the moment.

Note:

Please note SNR value could not adjust, it is automatically generated. SNR values will vary on the quality of the copper wire and environment factors.

5.7 Select "Channel Status"

This function shows VDSL2 port status. A screen is displayed as shown in Figure 5.7

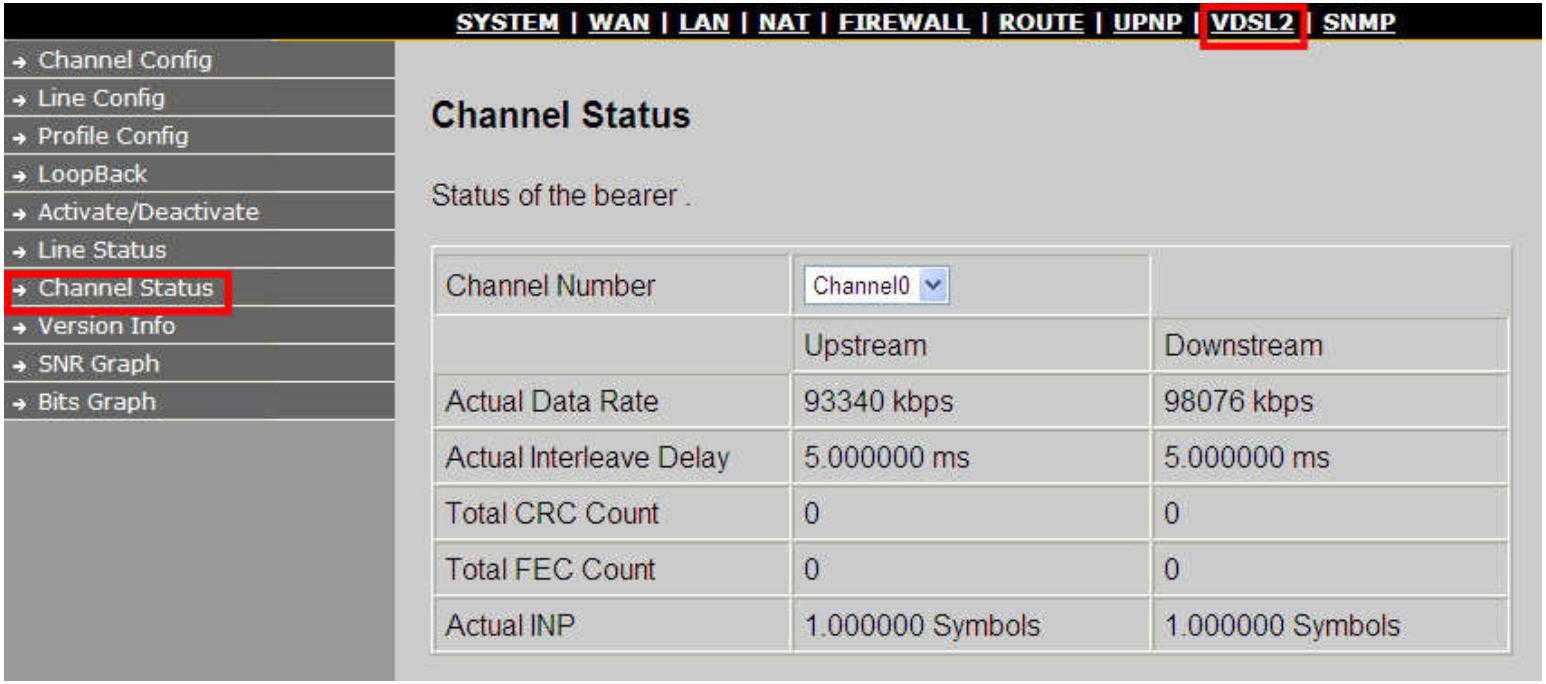


Figure 5.7 Channel Status

Note:

The channel status shows accurate value as data rate, CRC, INP...etc when link established. All values will vary on the quality of the copper wire and environment factors.

5.8 Select "Version Info"

This function shows VDSL2 hardware and firmware version. A screen is displayed as shown in Figure 5.8

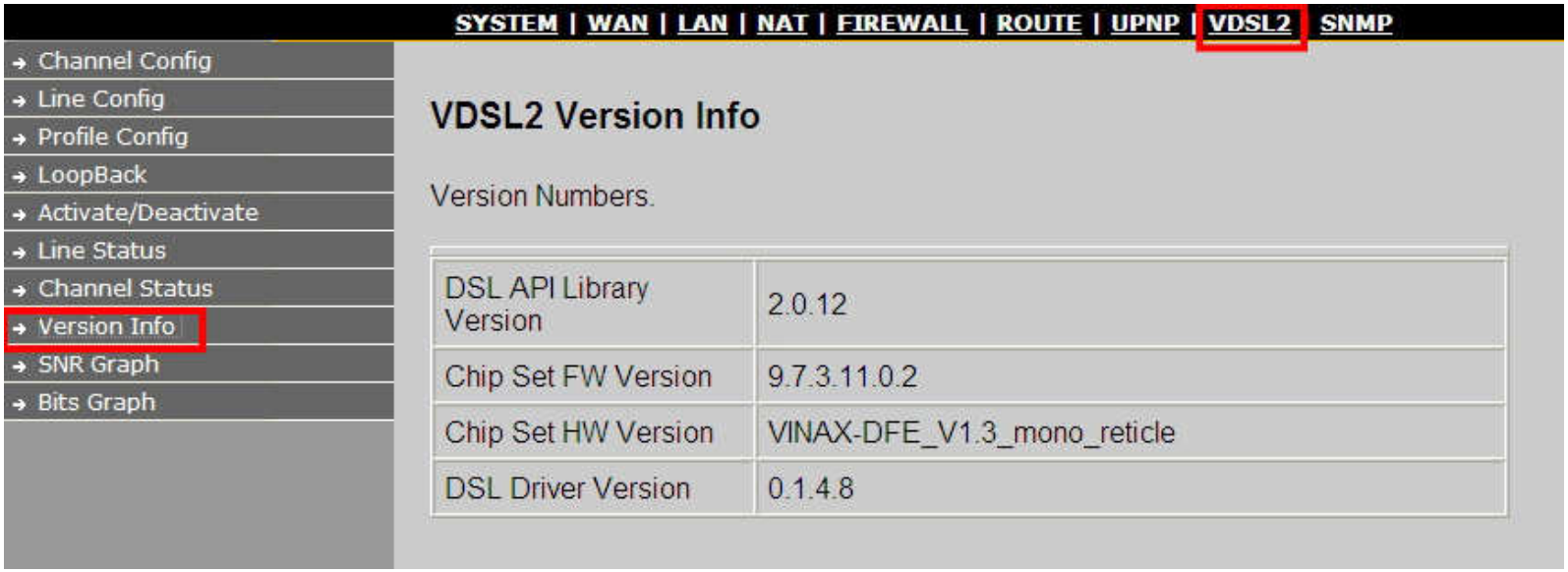


Figure 5.8 Display of Version Data

Note:

If you would like to search web interface version, please refer to section 4.3.3.

5.9 Select "SNR Graphs"

When NV-600LI link with NV-600RI, this graph will show the SNR value for each band. Shown power level in upstream and downstream spectrum, The higher the SNR value, the better the performance. A screen is displayed as shown in Figure 5.9.1 and Figure 5.9.2

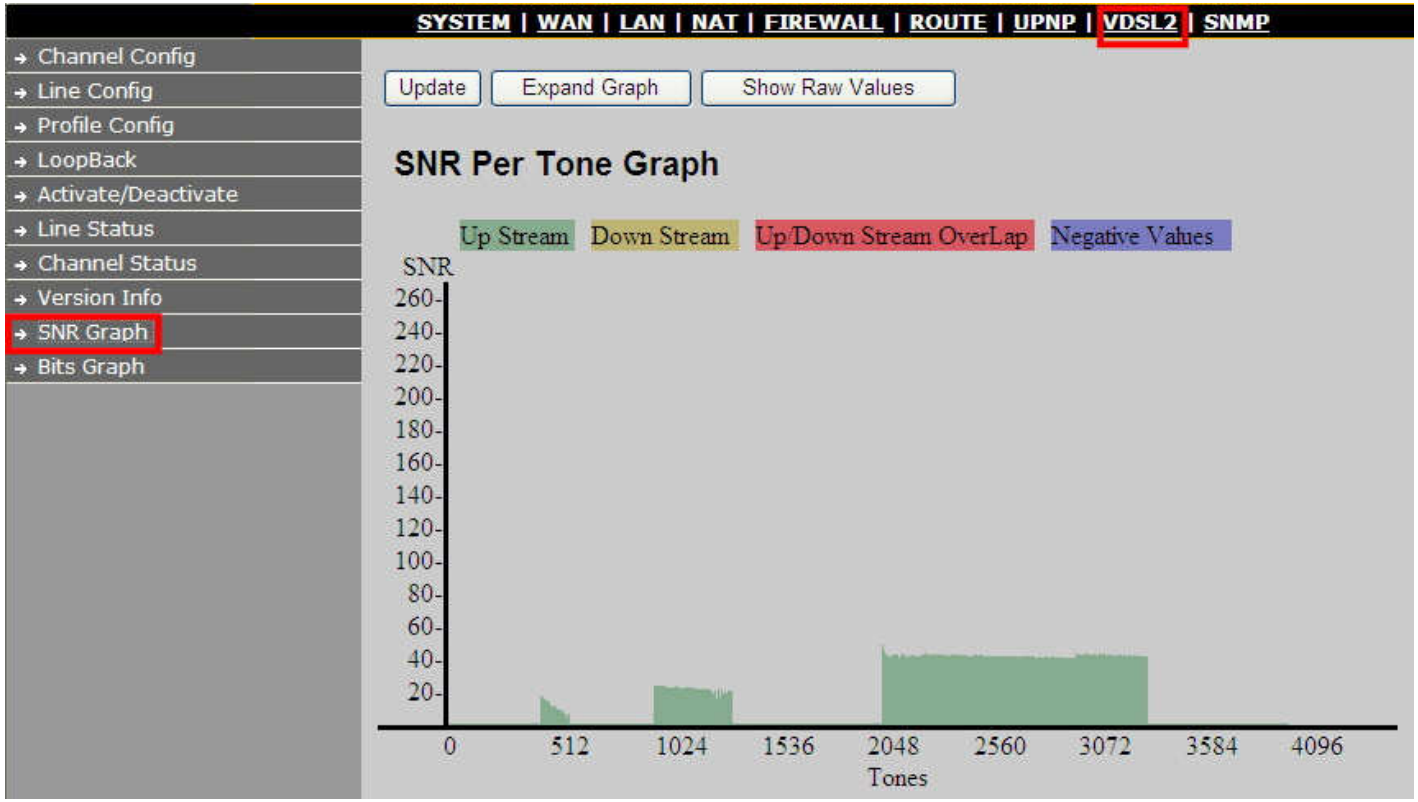


Figure 5.9.1 Display of NV-600LI SNR per Carrier

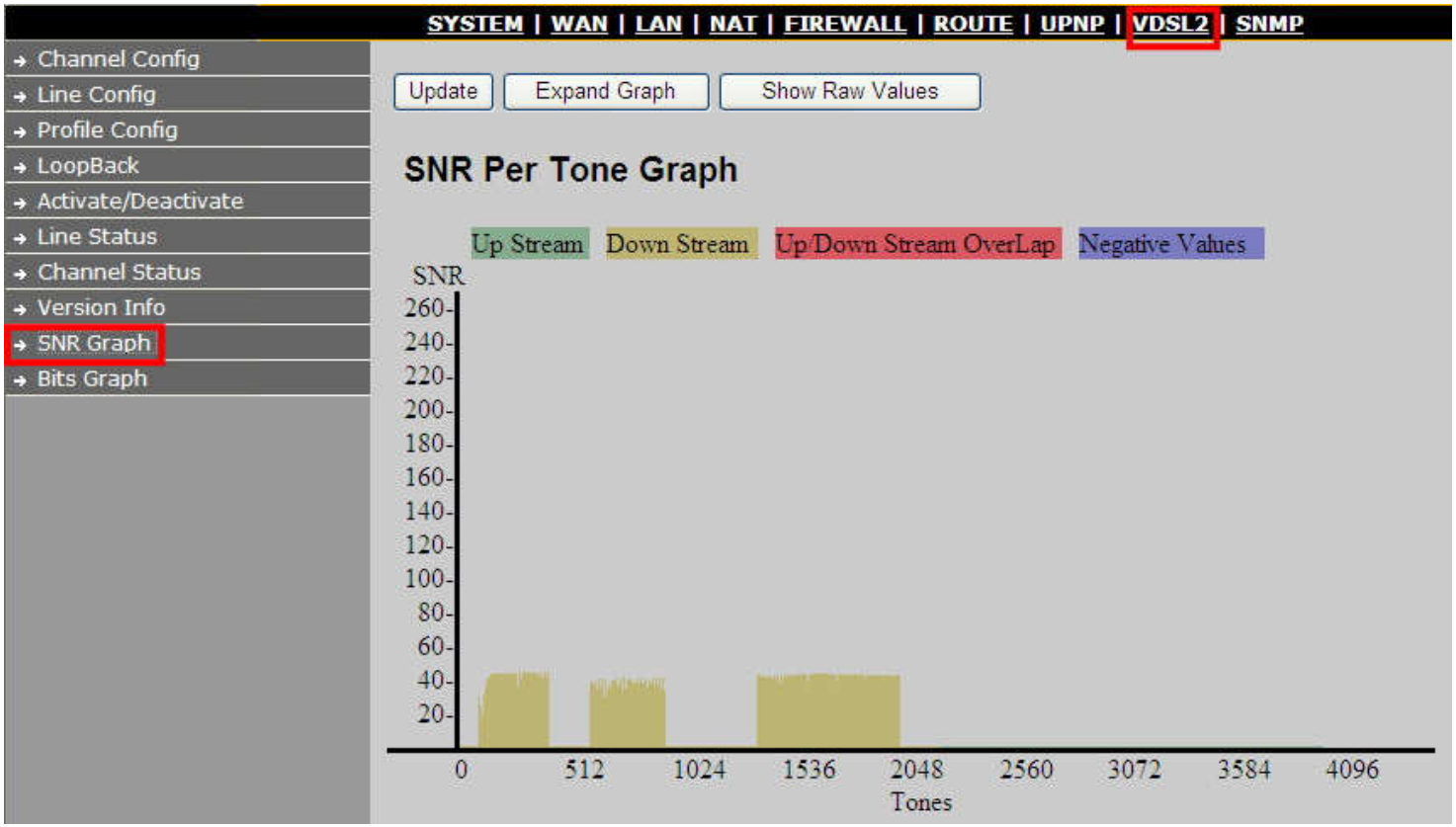


Figure 5.9.2 Display of NV-600RI SNR per Carrier

Following graph shows the snr per tone expand graph, please press "**Expand Graph**" button to get the graph. A screen is displayed as shown in Figure 5.9.3 and Figure 5.9.4

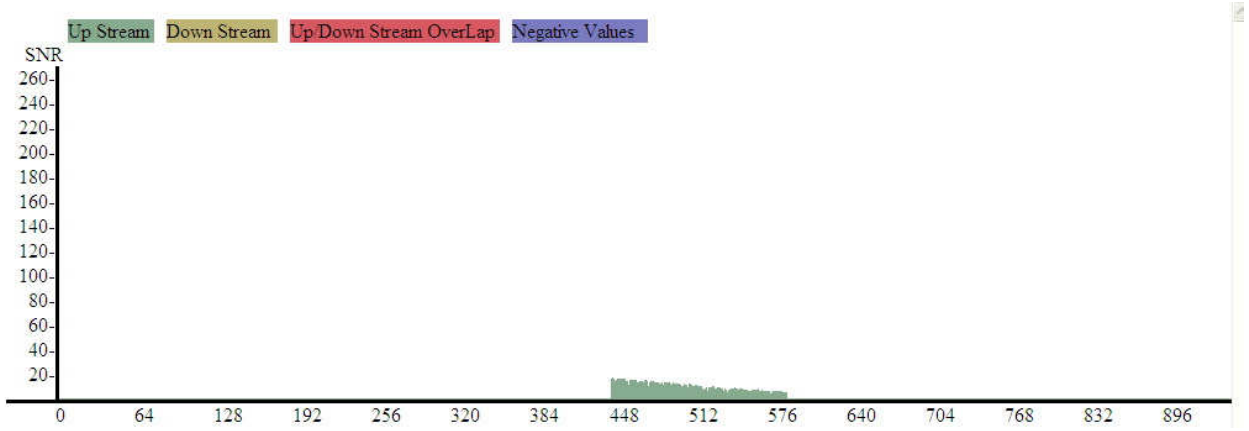


Figure 5.9.3 NV-600LI snr per tone expand graph

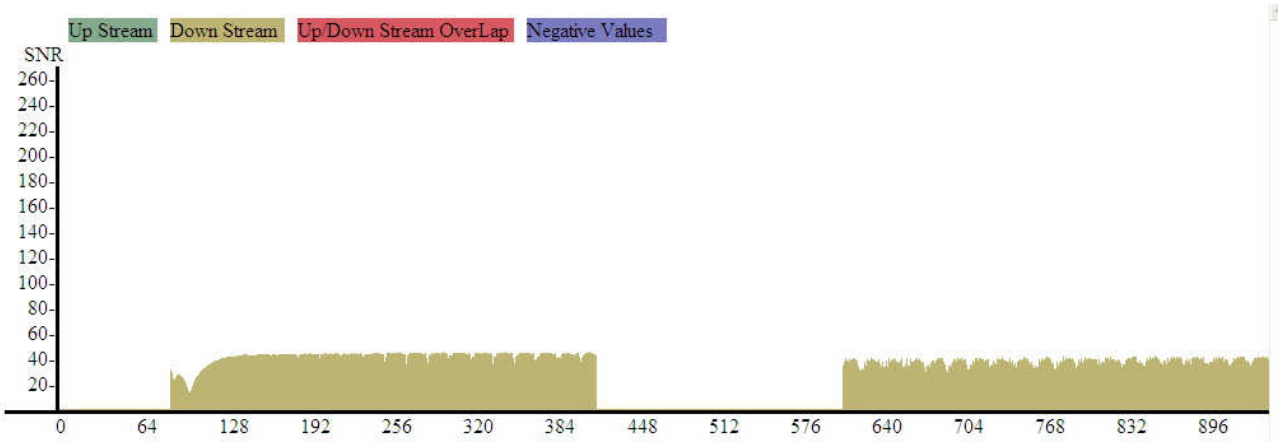


Figure 5.9.4 NV-600RI snr per tone expand graph

Following chart shows the snr per tone expand value, please press expand "**Show Raw Values**" button to get the chart. A screen is displayed as shown in Figure 5.9.5 and Figure 5.9.6

	UpStream SNR										DownStream SNR									
Tones	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
10	0	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
20	0	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
30	0	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
40	0	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

Figure 5.9.5 NV-600LI snr per tone chart

	UpStream SNR										DownStream SNR									
Tones	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0	0	0	0	0	0	0	0	0	0
10	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0	0	0	0	0	0	0	0	0	0
20	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0	0	0	0	0	0	0	0	0	0
30	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0	0	0	0	0	0	0	0	0	0
40	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0	0	0	0	0	0	0	0	0	0

Figure 5.9.6 NV-600LI snr per tone chart

5.10 Select "Bits Graphs"

When NV-600LI link with NV-600RI, this graph will show the bits value for each tone. Shown tone length in upstream and downstream spectrum. A screen is displayed as shown in Figure 5.10

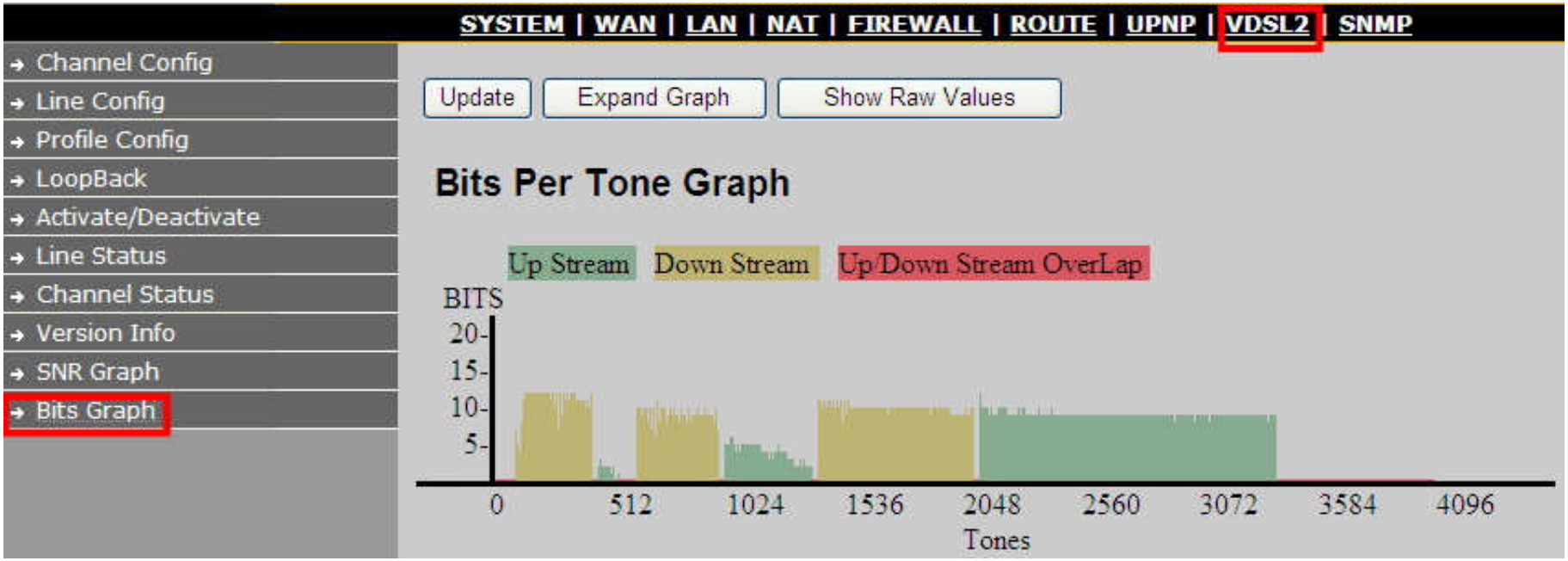


Figure 5.10.1 Display Bits Per Tone Graph

Following graph shows the bits per tone expand graph, please press "**Expand Graph**" button" to get the graph. A screen is displayed as shown in Figure 5.10.2

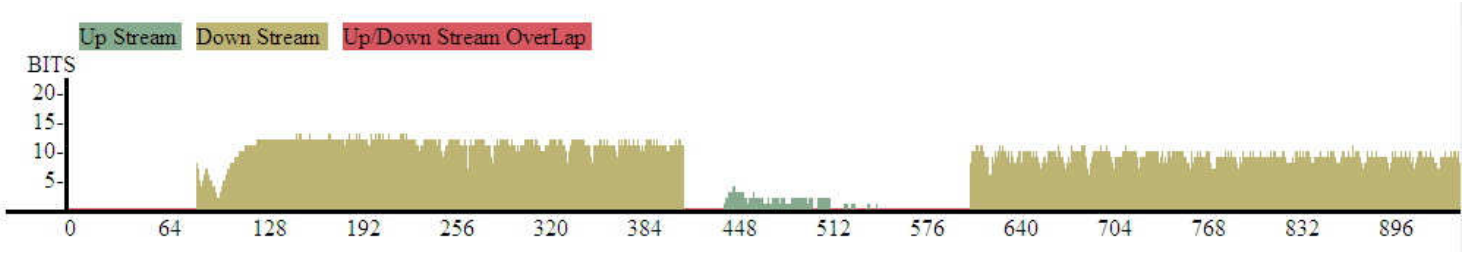


Figure 5.10.2 snr per tone expand graph

Following chart shows the bits per tone expand value, please press expand "**Show Raw Values**" button to get the chart. A screen is displayed as shown in Figure 5.10.3

	UpStream BITS										DownStream BITS									
Tones	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	5
90	0	0	0	0	0	0	0	0	0	0	4	5	6	7	7	6	5	5	4	4
100	0	0	0	0	0	0	0	0	0	0	3	2	2	3	4	5	5	6	7	7
110	0	0	0	0	0	0	0	0	0	0	8	8	8	9	9	9	10	10	10	10
120	0	0	0	0	0	0	0	0	0	0	11	11	11	11	11	11	11	11	12	12
130	0	0	0	0	0	0	0	0	0	0	12	12	12	12	12	12	12	12	12	12
140	0	0	0	0	0	0	0	0	0	0	12	12	12	12	12	12	12	12	12	12
150	0	0	0	0	0	0	0	0	0	0	12	12	12	12	12	13	12	13	13	12

Figure 5.10.3 bits per tone expand graph

Regarding the describe of "tone graph"(Only reference):

"If slow service is indicated, technicians can look at the bits per tone measurement. Dips in the bit per tone graph indicate interference. Checking the frequency of the interference often makes it possible to identify its cause. The accompanying chart shows the frequencies associated with common interference sources, such as T1,E1 and HDSL. If the bits per tone are taking a hit and it is determined that noise is not the cause, then the cause could be a DC fault, such as a bridge tap or a wet section. Very low or nonexistent bits per tone in the high frequency band indicate the presence of a long loop. If there is a major dip in the bits-per-tone graph but the noise power-per-tone graph does not show any abnormalities, the most likely troubles are bridged taps or wet sections on the span. Use a loop-troubleshooting tool with a TDR to find and fix these problems. If the bits per tone are low across the whole bandwidth, the cause is most likely DC troubles on the loop, such as shorts or grounds. A major dip in bits per tone indicates AC trouble on the loop. To verify the type of AC trouble, compare the bits per tone to SNR. If the noise influence and bits-per-tone dip occur at the same frequency, the degraded performance is most likely due to a transmission influence. The particular frequency will help identify the source of influence or crosstalk.

Chapter 6. Configure the NV-600LI/RI via Console

6.1 Setup on Hyperterminal

Open the Hyperterminal and set the baud rate to **115200, 8N1N** to properly set the hyperterminal.

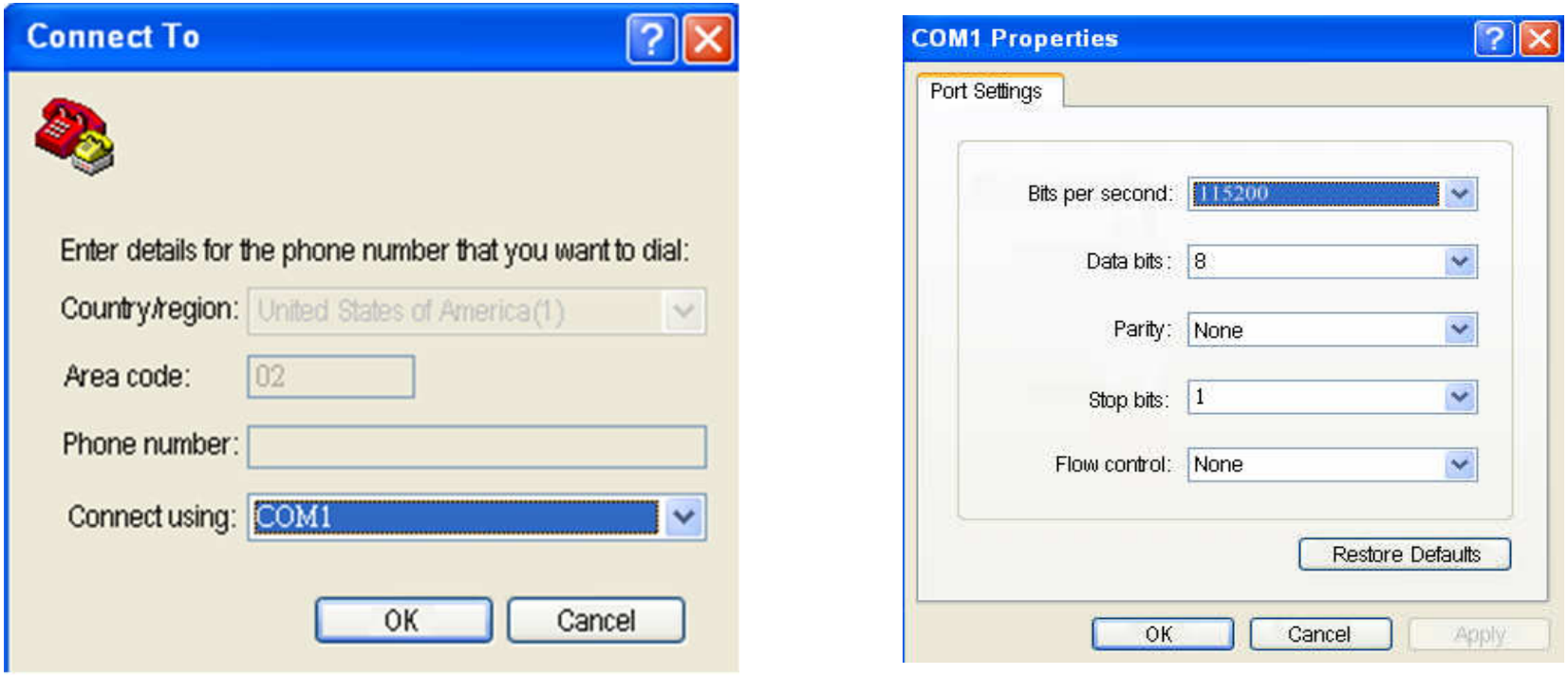


Figure 6.1 Hyperterminal Configuration

If the VDSL2 Router has been powered up already you will see a prompt by hitting the ENTER key. A screen is displayed as shown in Figure 6.2

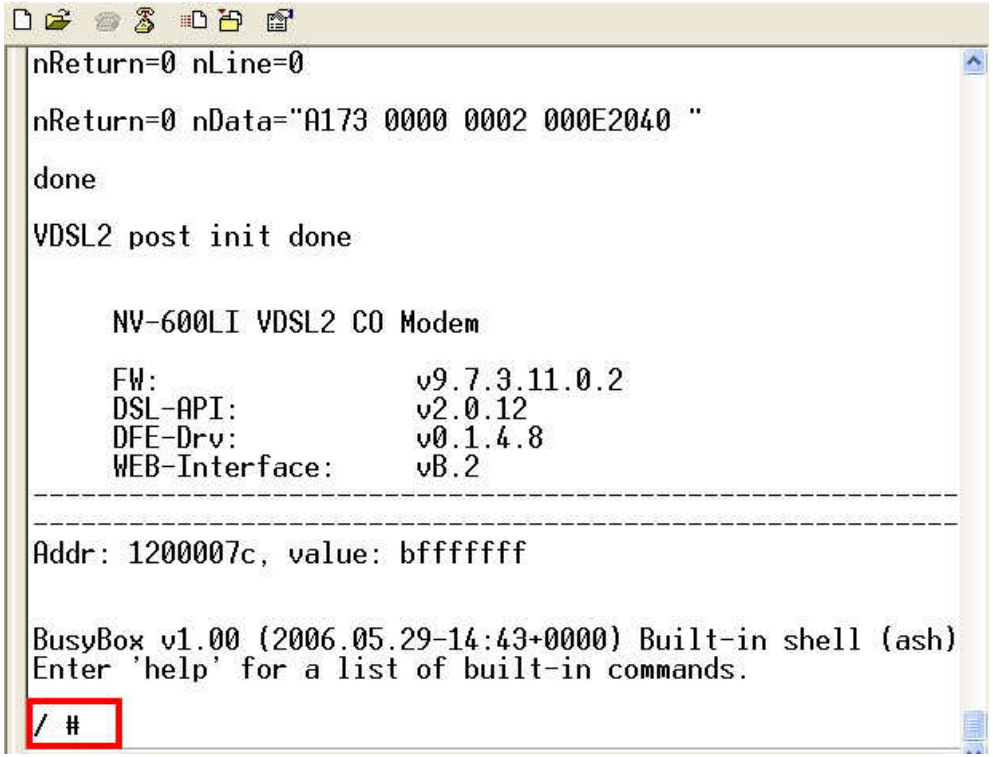


Figure 6.2 Command Line

Note:

As you may identify from the commands above Industrial VDSL2 Router is a Linux based device.
Many of the common Linux commands can be used here. However, please consider that you purchased a VDSL2 router device, not a PC. And always keep in mind that provider gives you support for configuring a standard VDSL2 router. If you try to use the VDSL2 router as a Linux hardware platform and modify its internal software structure, there is no support or warranty on the unit.

6.2 Check IP via CLI command

At the CLI command, write the command "ifconfig" to show the VDSL2 ip of web ui. Following screen is the NV-600LI, the NV-600RI looks very similar. A screen is displayed as shown in Figure 6.3

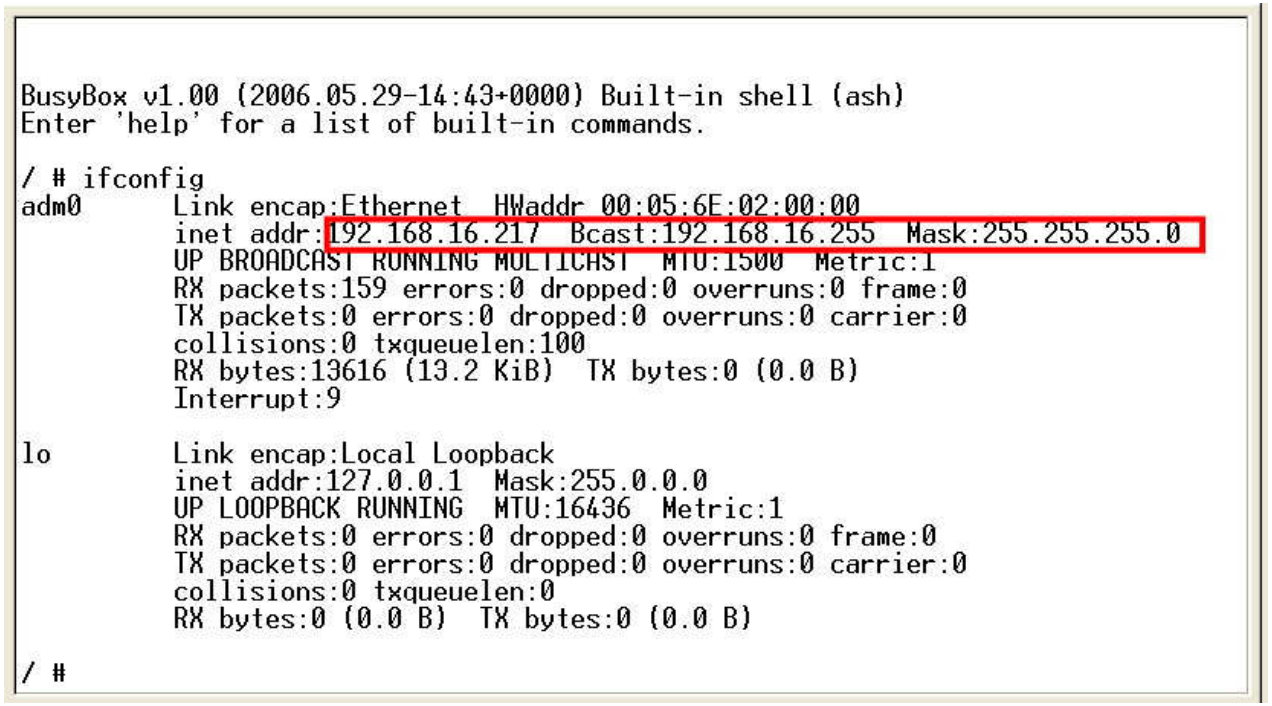

BusyBox v1.00 (2006.05.29-14:43+0000) Built-in shell (ash)
Enter 'help' for a list of built-in commands.
/ # ifconfig
adm0 Link encap:Ethernet HWaddr 00:05:6E:02:00:00
inet addr:192.168.16.217 Bcast:192.168.16.255 Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:159 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:100
RX bytes:13616 (13.2 KiB) TX bytes:0 (0.0 B)
Interrupt:9
lo Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
UP LOOPBACK RUNNING MTU:16436 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
/ #

Figure 6.3 ifconfig

Note:

You can use the serial Interface to configure an IP address by this command:

ifconfig adm0 <ipadress> netmask <subnetmask> (Example: ifconfig adm0 192.168.16.217 netmask 255.255.255.0)

This configuration is activated immediately but is only temporary because not stored in flash memory. We recommend you continue configuring by Web method.

6.3 Reset the system to default configuration

At the CLI command, write the command "**rawaccess –e**" to reset the system to default configuration. For it to take effect write the command "**reboot**" to restart the system. A screen is displayed as shown in Figure 6.4

Figure 6.4 Reset to default via CLI command

Appendix A: Cable Requirements

A.1 Ethernet Cable

A CAT 3~7 UTP (unshielded twisted pair) cable is typically used to connect the Ethernet device to the router. A 10Base-T cable often consists of four pairs of wires, two of which are used for transmission. The connector at the end of the 10Base-T cable is referred to as an RJ-45 connector and it consists of eight pins. The Ethernet standard uses pins 1, 2, 3 and 6 for data transmission purposes. (Table A-1)

Table A-1 RJ-45 Ethernet Connector Pin Assignments

PIN #	MDI		MDI-X	
	Signal	Media Dependant interface	**Signal**	Media Dependant interface-cross
1	TX+	Transmit Data +	RX+	Receive Data +
2	TX-	Transmit Data -	RX-	Receive Data -
3	RX+	Receive Data +	TX+	Transmit Data +
4	--	Unused	--	Unused
5	--	Unused	--	Unused
6	RX-	Receive Data -	TX-	Transmit Data -
7	--	Unused	--	Unused
8	--	Unused	--	Unused

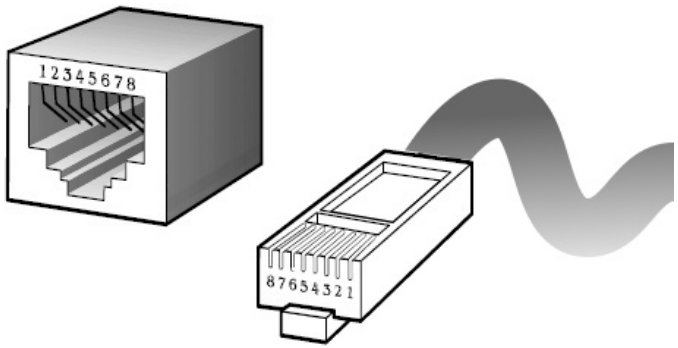


Figure A-1 Standard RJ-45 repectacle/connector

Note:

Please make sure your connected cables are with same pin assignment as above table before deploying the cables into your network.

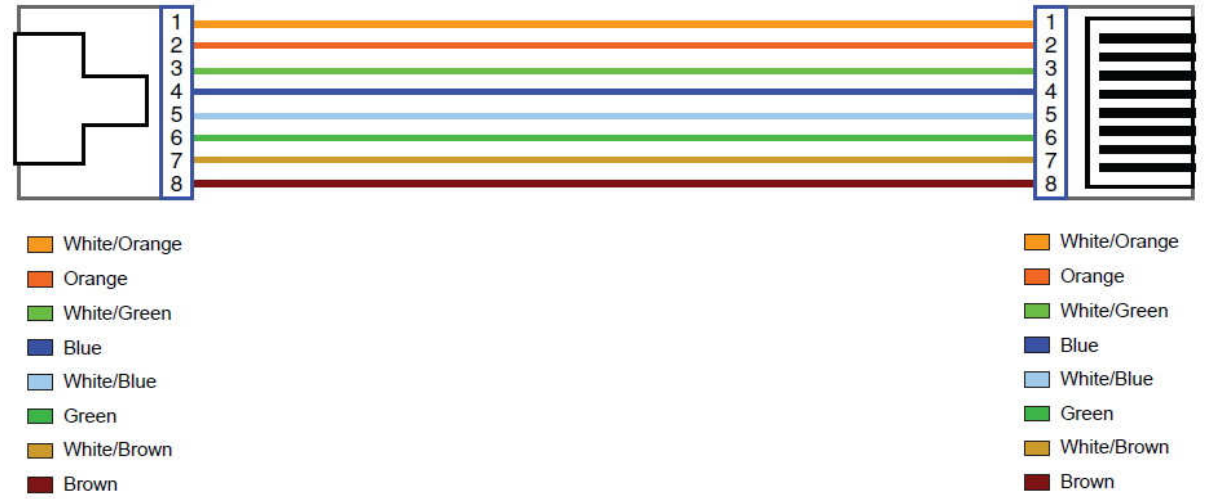


Figure A-2 Pin Assignments and Wiring for an RJ-45 Straight-Through Cable

Figure A-3 Pin Assignments and Wiring for an RJ-45 Crossover Cable

Appendix B: Product Specification

Key Features & Benefits

- Supports auto speed for Line port
- Supports high bandwidth up to 100Mbps symmetric over line ports
- Supports Web management (HTTP), TFTP
- Support uPnP/PPPoE/NAT/DHCP/DMZ/Firewall
- Support Route & Switch (Bridge) mode
- Supports Loop back test
- Support SNMP v1/v2/v3
- Supports SNR indicator for checking phone wiring quality
- Supports Interleave Delay to prevent against noise and data errors
- Support 8a, 8b, 8c, 8d, 12a, 12b, 17a, 17b, and 30a band profile
- Support 997, 998 band plan
- Provides surge protection
- Support power redundant and wide range dual power input(DC12V ~ 48V)
- Supporst Overload Current Protection
- Supports wide range operating temperature(-20℃ ~ 70℃)
- Supports Reverse Polarity Protection
- Supports alarm contact (relay output - 1 A @ 24 VDC)
- Supports DIN-Rail mount installation
- Metal case design and compliant with IP30 standard

Product Specification

Standard:	IEEE802.3 / IEEE802.3u standard ITU-T G993.2 VDSL2 standard
Physical Interface:	4 * RJ-45 10/100Mbps auto-sensing Ethernet port 1 * RJ-11/Terminal Block connector for VDSL2 line port 1 * Console port(RS-232C/115200bps) 1 * removable 6-contact terminal blocks for power1 and alarm contact 1 * removable 2-contact terminal blocks for power2
Flow control:	Full duplex: IEEE 802.3x Half duplex: Back pressure
LED Indicators:	1 * Power LED 4 * Link/Active Status for Ethernet port 1 * Link LED for VDSL2 port
Switch method:	Store and forward
VDSL2 Line Code:	Discrete multitone (DMT) modulation
VDSL2 Transmission Mode:	Packet Transfer Mode (PTM)
Typical Power Consumption:	NV-600LI (LT): 5.52W NV-600RI (NT):6.12W
Power Input:	Input Voltage: 12 to 48VDC Input Current: NV-600LI(0.46~0.115A) NV-600RI(0.51~0.128A)

EMC:	EMI Compliant: FCC Class A EMS Compliant: CE mark
Operating Temperature:	-20℃ ~ 70℃ (-4℉ ~ 158℉) Fanless, free air cooling
Storage Temperature:	-40℃ ~ 70℃ (-40℉ ~158℉)
Humidity:	5% to 95% (non-condensing)
Weight:	About 0.8 kgs
Dimensions:	182 x 147 x 35 mm (7.16" x 5.78" x 1.37")

Appendix C: Troubleshooting

Diagnosing the Router's Indicators

The router can be easily monitored through its comprehensive panel indicators. These indicators assist the network manager in identifying problems the hub may encounter. This section describes common problems you may encounter and possible solutions.

1. Symptom:	POWER indicator does not light up (green) after power on.
Cause:	Defective External power supply
Solution:	Check the power plug by plugging in another that is functioning properly. Check the power cord with another device. Check the terminal block make sure to fasten the power cord. If these measures fail to resolve the problem, have the unit power supply replaced by a qualified distributor.
Note:	Please refer to power status table to check power input status. Section 3.4

2. Symptom:	Link indicator does not light up (green) after making a connection.
Cause:	Network interface (ex. a network adapter card on the attached device), network cable, or switch port is defective.
Solution:	2.1 Power off and re-power on the VDSL2 router. 2.2 Verify that the switch and attached device are power on. 2.3 Be sure the cable is plugged into both the switch and corresponding device. 2.4 Verify that the proper cable type is used and its length does not exceed specified limits. 2.5 Check the router on the attached device and cable connections for possible defects. 2.6 Make sure that the phone wire must be connecting NV-600LI/RI first, when powered on. 2.7 Replace the defective router or cable if necessary.

3. Symptom:	VDSL Link cannot be established.
Cause:	VDSL setting failure or phone cable length is over the specification limit.
Solution:	3.1 Please make sure that the phone wire must be connected between NV-600LI(CO) and NV-600RI (CPE) when both are power on. NV-600LI (CO) will do link speed function depending on phone wire length, therefore if NV-600LI (CO) can't detect NV-600RI (CPE) over phone wire while both power on, this will cause the link to fail. 3.2 Please check phone wire, we recommend use 24-26 gauge with twisted pair and without rust. 3.3 Please reinsert power when change cable length or link time over 3 minute.
Note:	Phone wire must meet CAT 3 standard or above and **without clustering**, otherwise will cause more cross talk issue to reduce DSL power driver.

4. Problem:	What is VDSL2? (Only reference)
Answer:	Very-high-speed digital subscriber line 2 (VDSL2) is an access technology that exploits the existing infrastructure of copper wires that were originally deployed for traditional telephone service. It can be deployed from central offices, from fiber-optic connected cabinets located near the customer premises, or within buildings. It was defined in standard ITU-T G.993.2 finalized in 2005. VDSL2 was the newest and most advanced standard of digital subscriber line (DSL) broadband wireline communications. Designed to support the wide deployment of triple play services such as voice, video, data, high definition television (HDTV) and interactive gaming, VDSL2 was intended to enable operators and carriers to gradually, flexibly, and cost-efficiently upgrade existing xDSL infrastructure.

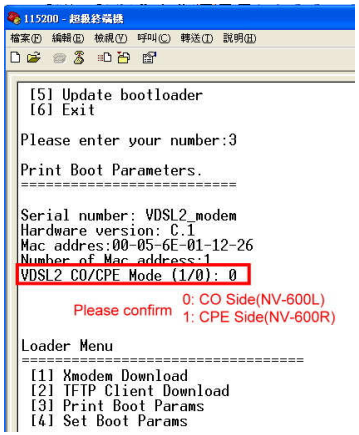
	The protocol was standardized in the International Telecommunication Union telecommunications sector (ITU-T) as Recommendation G.993.2. It was announced as finalized on 27 May 2005,[1] and first published on 17 February 2006. Several corrections and amendments were published in 2007 through 2011. VDSL2 is an enhancement to very-high-bitrate digital subscriber line (VDSL), Recommendation G.993.1. It permits the transmission of asymmetric and symmetric aggregate data rates up to 200 Mbit/s downstream and upstream on twisted pairs using a bandwidth up to 30 MHz. VDSL2 deteriorates quickly from a theoretical maximum of 250 Mbit/s at source to 100 Mbit/s at 0.5 km (1,600 ft) and 50 Mbit/s at 1 km (3,300 ft), but degrades at a much slower rate from there, and still outperforms VDSL. Starting from 1.6 km (1 mi) its performance is equal to ADSL2+. ADSL-like long reach performance is one of the key advantages of VDSL2. LR-VDSL2 enabled systems are capable of supporting speeds of around 1–4 Mbit/s (downstream) over distances of 4–5 km (2.5–3 miles), gradually increasing the bit rate up to symmetric 100 Mbit/s as loop-length shortens. This means that VDSL2-based systems, unlike VDSL1 systems, are not limited to short local loops or MTU/MDUs only, but can also be used for medium range applications.

5. Problem:	What is SNR(Signal-to-Noise)? (Only reference)
Answer:	Signal-to-noise ratio (often abbreviated SNR or S/N) is a measure used in science and engineering that compares the level of a desired signal to the level of background noise. It is defined as the ratio of signal power to the noise power. A ratio higher than 1:1 indicates more signal than noise. While

	SNR is commonly quoted for electrical signals, it can be applied to any form of signal (such as isotope levels in an ice core or biochemical signaling between cells). The ratio is usually measured in decibels(dB) The signal-to-noise ratio, the bandwidth, and the channel capacity of a communication channel are connected by the Shannon–Hartley theorem. In digital communications, the SNR will probably cause a reduction in data speed because of frequent errors that require the source (transmitting) computer or terminal to resend some packets of data. SNR measures the quality of a transmission channel over a network channel. The greater the ratio, the easier it is to identify and subsequently isolate and eliminate the source of noise.

6. Symptom:	Connected the CO Router with CPE Router within 300 meters RJ-11 phone cable got only less than 10 Mbit/s.
Cause:	Some testing program which is base on TCP/IP protocol such as FTP, Iperf, NetIQ, the bandwidth of testing outcome will be limited by TCP window size.
Solution:	We recommend to test VDSL2 bandwidth best by Smartbit equipment, if you don't have Smartbit, we recommend test that by IPERF program, and TCP window size must be settled max. 64k, the parameter as iperf –c server IP address –i 1 –t 50 –w 65535 for client side.

7. Symptom:	VDSL2 CO router cannot link with CPE router.
Cause:	1. The VDSL2 CO/CPE mode settings of VDSL2 router become unknown. VDSL2 CO and CPE router tone mode is different due to mixed use of new and old hardware

	VDSL2 routers.
Solution:	1. Using the console, reboot the system and go to loader menu. Select set boot parameters and choose the VDSL2 CO/CPE mode correctly. Choose "1" if it is CO router and "0" if it is CPE router. Do not just press enter to skip the setting as it will not retain even if the setting is correct, then it will become unknown causing the VDSL2 router not to link. 0: NV-600LI. 1: NV-600RI.  2. Update the old hardware to latest firmware so that you can set the same tone mode for both CO and CPE router.

8. Symptom:	VDSL2 web management that uses public IP address cannot be accessed.
Cause:	It can be affected by some incoming traffic perhaps web crawlers, worms or other automated activity.
Solution:	Open a command prompt and log in to telnet by writing "telnet xxx.xxx.xxx.xxx", xxx is the IP address of your router, then write "cd /etc/rc.d/init.d" to go to this folder, then write "./httpd start" to open the web management, so that it can be accessed again.

System Diagnostics

Power and Cooling Problems

If the POWER indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord, or internal power supply as explained in the previous section. However, if the unit power is off after running for a while, check for loose power connections, power losses or surges at the power outlet. If you still cannot isolate the problem, then the internal power supply may be defective. In this case, please contact your local dealer.

Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (e.g. the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

Transmission Mode

The default method of selecting the transmission mode for RJ-45 ports is 10/100 Mbps ETHERNET, for RJ-11 port are auto-negotiation VDSL. Therefore, if the Link signal is disrupted (e.g. by unplugging the network cable and plugging it back in again, or by resetting the power), the port will try to reestablish communications with the attached device via auto-negotiation. If auto-negotiation fails, then communications are set to half duplex by default. Based on this type of industry-standard connection policy, if you are using a full-duplex device that does not support auto-negotiation, communications can be easily lost (i.e. reset to the wrong mode) whenever the attached device is reset or experiences a power fluctuation. The best way to resolve this problem is to upgrade these devices to a version that support Ethernet and VDSL.

Physical Configuration

If problems occur after altering the network configuration, restore the original connections, and try to track the problem down by implementing the new changes, one step at a time. Ensure that cable distances and other physical aspects of the installation do not exceed recommendations.

System Integrity

As a last resort verify the switch integrity with a power-on reset. Turn the power to the switch off and then on several times. If the problem still persists and you have completed all the preceding diagnoses, then contact your dealer.

Appendix D: IP-30 protection of metal case

The term "protection class" generally indicates the type of protection of a device or the internal workings of a device against direct contact and against the infiltration of foreign bodies, such as objects, dust or water.
The resistance to stress arising from prevailing working conditions is defined using international protection (IP) classes. These protection classes are, in turn, indicated in IP standards (DIN EN 60529), whereby a combination of two digits specifies the level of protection. The first digit indicates the level of resistance to foreign bodies and dust, the second digit the level of resistance to water infiltration. A higher value of the relevant digit (first digit 0 – 6, second digit 0 - 8) indicates a higher level of protection.

The table on the following offers clarity and an overview of the IP rules:

Table D-1 First Digit: Protection grades for contact and foreign matter protection.

Digit	Designation	Explanation
0	No protection	No special protection to prevent infiltration by solid objects.
1	Protection against large foreign matter	Protection against solid objects greater than 50 millimeters in diameter.
2	Protection against mediumsized Foreign matter	Protection against solid objects greater than 12.5 millimeters in diameter.
3	Protection against small foreign matter	Protection against solid objects greater than 2.5 millimeters in diameter.
4	Protection against circular foreign matter	Protection against solid objects greater than 1 millimeter in diameter.
5	Dust protected	Complete protection against dust is not necessary, but infiltration must be prevented to a sufficiently high degree to ensure that the functioning and safety of the device are not impaired.
6	Dustproof	Complete protection against dust infiltration

Table D-2 Second Digit: Protection grades for water protection.

Digit	Designation	Explanation
0	No protection	No special protection to prevent water infiltration.
1	Protection against vertically dripping water	Water dripping vertically on to the device may not have any harmful effect.
2	Protection against water dripping at an angle	Water dripping vertically onto a device tilted to an angle of up to 15°from the vertical may not have any harmful effect.
3	Protection against spray water	Protection against water sprayed at any angle up to 60°from the vertical on to the device.
4	Protection against splash water	Water splashing against the device from any direction may not have any harmful effect.
5	Protection against water jets	A jet of water aimed at the housing from any direction may not have any harmful effect.
6	Protection against strong water jets	A strong water jet aimed at the device from any direction may not have any harmful effect.
7	Protection against temporary immersion	When the device is immersed in water up to 1 meter from the lower edge of the device, water may not enter the device in any sufficient quantity to cause damage.
8	Protection against continuous immersion	The device is suitable for continuous immersion in water. The conditions must be individually agreed between the manufacturer and the user but must, at least, exceed the specification of digit 7.

Appendix E: Compliance Information

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a computing device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. The equipment and the receiver should be connected to outlets on separate circuits.
4. Consult the dealer or an experienced radio/television technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If this telephone equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the

proper functioning of your equipment. If they do, you will be notified in advance in order for you to make necessary modifications to maintain uninterrupted service.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

FCC Warning

This equipment has been tested to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment can generate, use, and radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at owner's expense.

CE Mark Warning

This is a class B product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

WEEE Warning

To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

Warranty

The original owner that the product delivered in this package will be free from defects in material and workmanship for one year parts after purchase.

There will be a minimal charge to replace consumable components, such as fuses, power transformers, and mechanical cooling devices. The warranty will not apply to any products which have been subjected to any misuse, neglect or accidental damage, or which contain defects which are in any way attributable to improper installation or to alteration or repairs made or performed by any person not under control of the original owner.

The above warranty is in lieu of any other warranty, whether express, implied, or statutory, including but not limited to any warranty of merchantability, fitness for a particular purpose or any warranty arising out of any proposal, specification or sample. We shall not be liable for incidental or consequential damages. We neither assume nor authorize any person to assume for it any other liability.

WARNING:

DO NOT TEAR OFF OR REMOVE THE WARRANTY STICKER AS SHOWN, OR THE WARRANTY IS VOID.

Chinese SJ/T 11364-2006

部件名称	有 毒 有 害 物 质 或 元 素					
	铅(Pb)	汞(Hg)	镉(Cd)	六价铬[Cr(VI)]	多溴联苯(PBB)	多溴二苯醚(PBDE)
结构壳体	○	○	○	○	○	○
电路组	○	○	○	○	○	○
包装及配件	○	○	○	○	○	○
○：表示该有毒物质在该部件所有均质材料中的含量均在 SJ/T 11364/2006 标准规定的限量要求以下。 ╳：表示该有毒物质至少在该部件的某依均质材料中的含量超出 SJ/T 11364-2006 标准规定的限量要求。						

上述规范仅适用於中国法律